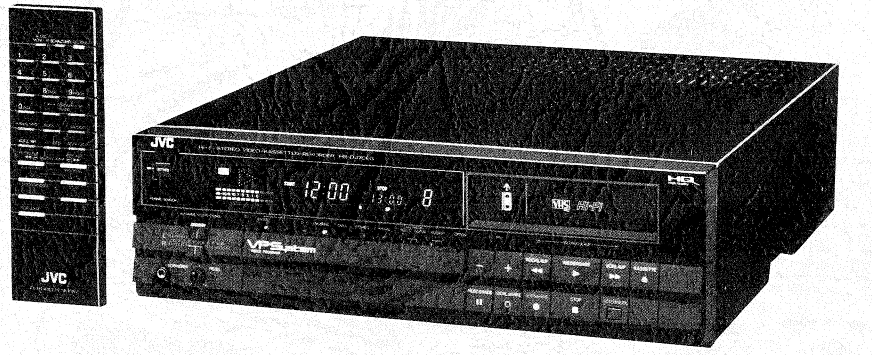
JVC

SERVICE MANUAL

Hi-Fi STEREO VIDEO CASSETTE RECORDER VHS PAL

HR-D470E/EG/EK



№5

HQ High Quality

SPECIFICATIONS

Format	VHS PAL standard with Hi-Fi audio
Video recording system	Rotary two-head helical scan system
Hi-Fi audio recording system	Deep-layer recording system conforming to stereo Hi-Fi VHS standard
No. of audio channels	2 Hi-Fi audio channels 1 normal audio channel
Video signal system	PAL colour and CCIR monochrome signals, 625 lines
Tape width	12.65 mm
Tape speed (SP)	23.39 mm/sec
(LP)	11.70 mm/sec (Hi-Fi audio only)
Maximum recording time (SP)	240 min. with E-240 video cassette
(LP)	480 min. with E-240 video cassette (Hi-Fi audio only)
Temperature	
Operating	5°C to 40°C
Storage	-20°C to 60°C
Power requirement	220 V∿, 50/60 Hz
Power consumption	37 W
Video	
Input	0.5 to 2.0 Vp-p, 75 ohms, unbalanced
Output	1.0 Vp-p, 75 ohms, unbalanced
Signal-to-noise ratio	43 dB (Rohde & Schwarz noise meter) with BILDSCHÄRFE control at centre position
Horizontal resolution	250 lines with BILDSCHÄRFE control at centre position
Audio	
Input	AUDIO/VIDEO socket (21-pin Peri connector): -3.8 dBs (CENELEC standard), 10 k-ohms, unbalanced AUDIO EING. connector (RCA x 2): -20 dBs, 50 k-ohms, unbalanced
Output level	AUDIO/VIDEO socket (21-pin Peri connector): -3.8 dBs (CENELEC standard), high impedance load AUDIO AUSG. connector (RCA x 2): -6 dBs, high impedance load
Output impedance	Less than 1 k-ohm, unbalanced
Signal-to-noise ratio	More than 40 dB
Frequency range	70 Hz to 10,000 Hz
Hi-Fi audio	
Frequency response	20 Hz – 20,000 Hz
Dynamic range	More than 80 dB
Wow and flutter	Less than 0.005 % WRMS
TV tuner/RF section	
Channel storage capacity	32 channels
Aerial input	VHF 47 – 89 MHz, 104 – 300 MHz, 302 – 470 MHz UHF 470 – 862 MHz
Aerial output	UHF channels 32 – 40 (Adjustable)
Digital clock/timer	
Clock display	24-hour fluorescent digital display with day and date indication
Reference frequency	Quartz controlled
Start time setting	Within one year
Programming capacity	8 programmes
Dimensions	340 mm(W) x 105 mm(H) x 380 mm(D)
Weight	7.7 kg
Provided accessories	Aerial cable, Cassette tape, Infrared remote control, "R03"-size battery x 2, Audio cable (RCA-RCA),

Specifications shown are for SP mode unless otherwise specified.
Design and specifications subject to change without notice.

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No. 8465
September 1986

NOTE: For a technical description, please refer to Technical Guide T-8050 HR-D470 PAL.

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▨) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors

5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

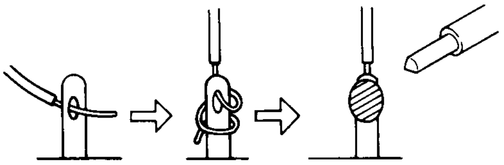

Fig. 1

6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

7. Check that replaced wires do not contact sharp edged or pointed parts.

8. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.

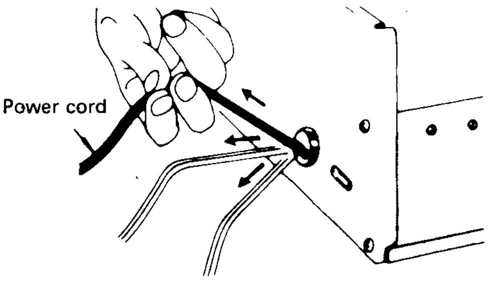

Fig. 2

9. Also check areas surrounding repaired locations.

10. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

11. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.
    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

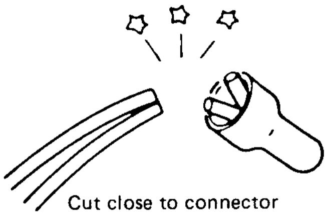

Fig. 3

       (2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

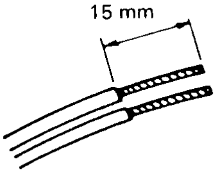

Fig. 4

       (3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

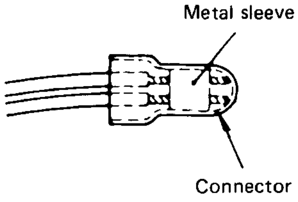

Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

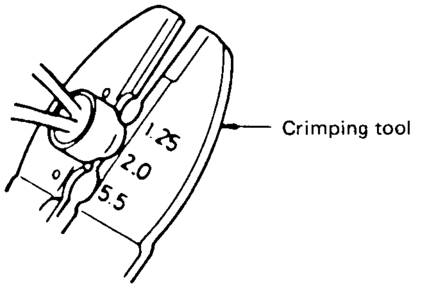

Fig. 6

(5) Check the four points noted in Fig. 7.

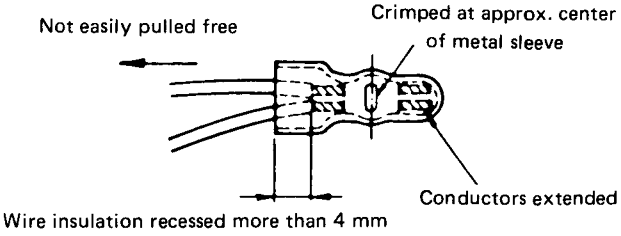
Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
   Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.
2. **Dielectric strength test**
   Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.
3. **Clearance distance**
   When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table below.

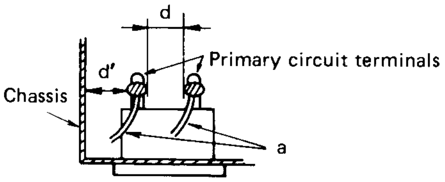

Fig. 8

4. **Leakage current test**
   Confirm specified or lower leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

   Measuring Method: (Power ON)
   Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure and following table.

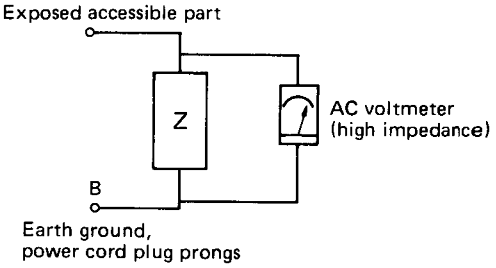

Fig. 9

AC Line Voltage	Region	Insulation Resistance	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	≧ 1 mΩ/500 V DC	1 kV 1 minute	≧ 3 mm
110 to 130 V	USA & Canada	–	900 V 1 minute	≧ 3.2 mm
*110 to 130 V 200 to 240 V	Europe Australia	≧ 10 mΩ/500 V DC	4 kV 1 minute	≧ 6 mm (d) ≧ 8 mm (d') (a: Power cord)

*Class II model only.

Table 1 Ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (b) to:
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 µF 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current ratings for selected areas

Note: This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

INSTRUCTIONS

Thank you for purchasing the JVC HR-D470EG Hi-Fi Stereo Video Cassette Recorder. Before use, read this instruction booklet carefully for obtaining the best results from your new unit.

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SAFETY PRECAUTIONS

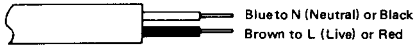
The rating plate and the safety caution are on the rear of the unit.

WARNING – DANGEROUS VOLTAGE INSIDE
WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

IMPORTANT (In the United Kingdom)
Mains Supply (240 V∿, 50 Hz only)

IMPORTANT

Do not make any connection to the Larger Terminal coded E or Green. The wires in the mains lead are coloured in accordance with following code:



If these colours do not correspond with the terminal identifications of your plug, connect as follows:
Blue wire to terminal coded N (Neutral) or coloured Black.
Brown wire to terminal coded L (Live) or coloured Red.
If in doubt – consult a competent electrician.

Note
We recommend that you should disconnect the AC cord from the outlet.

CAUTION

- Disconnect the mains plug from the supply socket when not in use.
- When you are not using the HR-D470EG for a long period of time, it is recommended that you disconnect the power cord from the AC outlet.
- Dangerous voltage inside. Refer internal servicing to qualified service personnel. To prevent electric shock or fire hazard, remove the power cord from the AC outlet prior to connecting or disconnecting any signal lead or aerial.

VHS PAL
High Quality

- Only cassettes marked "VHS" can be used with this video cassette recorder.
- HQ VHS is compatible with existing VHS equipment.

FOR YOUR SAFETY (in Australia)
Install any external aerial to AS 1417.1

Omkopplaren BETRIEB på denna apparat är sekundärt kopplad och skiljer inte apparaten från nätet i läge BETRIEB OFF.

The BETRIEB button does not completely shut off mains power from the unit, but switches operating current on and off.

BEMAERK: I stilling OFF er apparatet stadig forbundet med lysnettet Hvis det ønskes fuldstændig afbrudt skai netledningen trækkes ud.

This equipment has been produced to comply with Directive number 82/499/EEC (82/499/CEE).

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FEATURES

High-quality pictures

- **HQ (High Quality) System technologies** for superlative VHS pictures with a Detail Enhancer and a higher white clip level.

High-quality sound

- **Conforms to the Hi-Fi VHS standard** for superlative stereo sound with a dynamic range of more than 80 dB.
- **New audio switching noise reduction system** for cleaner-than-ever high-fidelity sound reproduction.
- **Hi-Fi audio Long Play mode** allows up to 8 hours of continuous Hi-Fi stereo sound recording and playback with a single cassette.
- Peak-hold audio level indicators/Hi-Fi Tracking meter.
- Hi-Fi recording level controls.

Tuner features

- **PLL frequency synthesized wide-band cable tuner** with 32-channel storage capacity.
- **Pretuned to European television broadcast frequencies:** VHF, UHF and cable channels including those of **hyper band.**
- **Sound Multiplex capability** for recording stereo and bilingual broadcasts.
- **10-Key random-access channel selection** and up/down scan tuning.
- **Compatible with VPS (Video Programme System)** with built-in VPS decoder.

Automatic functions

- **Music Scan;** up to 9 musical selections can be scanned in either direction.
- **Record mute function;** a 5-second blank can be inserted on the normal audio track between musical selections for automatic scanning.
- **Counter go-to function** for direct access to any specified point on the tape.
- **Fully automated playback procedure:** insert a cassette (with safety tab removed), and playback will start automatically.
- **Memory play function** for automatic start of playback after rewind to the beginning of the tape or rewind/fast forward to the counter reading of "0000".
- Automatic backspace editing.
- Auto-power-on convenience.
- Automatic power on/off for cassette ejection.
- Automatic rewind at the end of tape.

Other value features

- **New, contemporary styling in midi-component size (34 cm wide)** with motorised slot-loading cassette system.
- **1-Year/8-Event programmable timer with 10-key programming.**
- **On-screen record-pause mode display;** a white bar is displayed on the TV screen while in the record-pause mode.
- **Multi-function infrared remote control:** timer programming, music scan, direct counter go-to function, audio monitor selection, 10-key random-access channel selection, and more.
- **Switchable AC outlet** to timer-control a connected source component.
- **FM simulcast recording;** also allows independent TV and audio programming on the same cassette.
- **60-Minute memory backup** for clock and timer settings.
- Instant recording function with auto shut-off.
- Shuttle Search at 9 times normal speed.
- Picture sharpness control.
- Counter search function.
- Comprehensive fluorescent display with symbolic mode indicators.
- Remaining tape time indicator functioning during Record, Play, Fast Forward and Rewind.
- Headphone jack with level control.

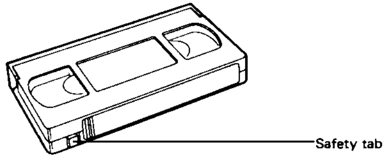
PRECAUTIONS

Handling and storage

- Avoid using the recorder under the following conditions:
  - extremely hot, cold or humid places,
  - dusty places,
  - near appliances generating strong magnetic fields,
  - places subject to vibrations, and
  - poorly ventilated places.
- Be careful of moisture condensation.
  Avoid using the recorder immediately after moving from a cold place to a warm place or soon after heating a room which was cold. The water vapour in warm air will condense on the still-cold video head drum and tape guides and may cause damage to the tape and the recorder.
- Handle the recorder carefully.
  - Do not block the ventilation openings.
  - Do not place anything heavy on the recorder.
  - Do not place anything which might spill and cause trouble on the top cover of the recorder.
  - Use in horizontal (flat) position only.
- In case of transportation,
  - Avoid violent shocks to the recorder during packing and transportation.
  - Before packing, be sure to remove the cassette from the recorder.

Video cassettes

- This recorder employs VHS-type cassettes only.
  E-240 for 4 hours, E-180 for 3 hours, E-120 for 2 hours, E-90 for 1 hour and 30 minutes, E-60 for 1 hour and E-30 for 30 minutes of recording.
  The recording time of each cassette can be doubled if you use the LP (Long Play) mode for recording Hi-Fi audio only.
- Video cassettes are equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording cannot be performed. If you wish to record on a cassette whose tab has already been removed, use adhesive tape to block the hole.



- Avoid exposing the cassettes to direct sunlight. Keep them away from heaters.
- Avoid extreme humidity, violent vibrations or shocks, strong magnetic fields (near a motor, transformer or magnet) and dusty places.
- Place the cassettes in cassette cases and position vertically.

Moisture condensation

- If you pour a cold liquid into a glass, water vapour in the air will condense on the surface of the glass. This is called moisture condensation.
- Moisture condensation on the head drum, one of the most crucial parts of the video recorder, will cause damage to the tape.
- Moisture in the air will condense on the recorder when you move it from a cold place to a warm place, after heating a cold room or under extremely humid conditions.
- This recorder is equipped with a moisture condensation prevention circuit which automatically heats the head drum according to the ambient temperature. This circuit operates when the unit is plugged into an AC outlet.
- The moisture condensation prevention circuit consumes only a slight amount of power. However, if for some reason you are not using the recorder for a long period of time, it is advisable to remove the power cord from the AC outlet.
- Since the moisture condensation prevention circuit cannot evaporate existing moisture condensation immediately after the power cord has been plugged into the AC outlet, you must allow for a few hours if the recorder is to be used in such areas as would occasion moisture condensation.

Operation

- When a cassette is loaded, the power is switched on automatically.
- The cassette can be unloaded even when the power is off. Pressing the KASSETTE button turns the power on and, after ejection of the cassette, shuts it off automatically in this case.
- As long as the SCHALTUHR button is engaged with the TIMER indicator lit, the BETRIEB and KASSETTE buttons have no effect and unloading of a cassette is not possible. If a cassette has not yet been inserted, simply insert a cassette; the power will be switched on to load the cassette properly and, after completion of automatic loading, the Timer Recording Standby mode will be engaged with power off.

Remote control unit

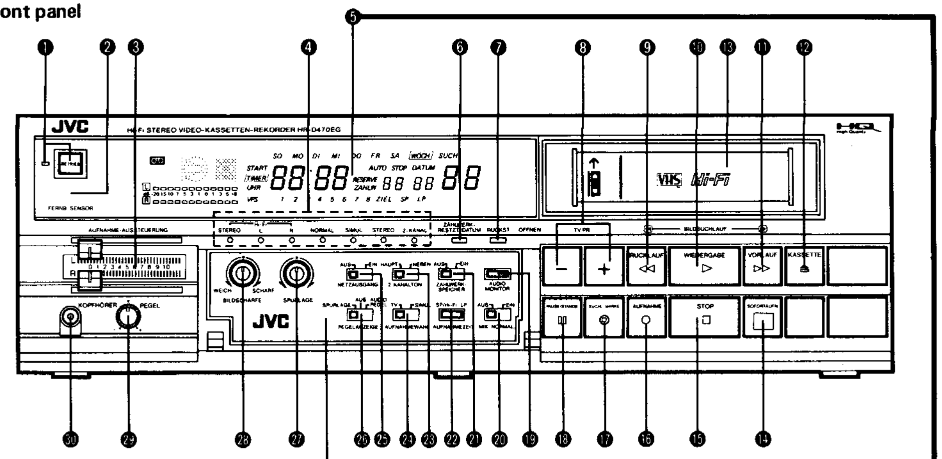
- Avoid violent shocks, especially take care not to drop the unit.
- Take care not to allow liquid to spill into the unit.
- Do not place heavy objects on the unit.
- Avoid leaving the unit in places subject to direct sunlight or extremely high temperatures.

WARNING

1. This recorder can also receive colour television signals in East Germany (DDR) for recording and playback.
2. Recordings made of DDR television signals produce monochrome pictures if played back on another video recorder of PAL or SECAM standard.
3. SECAM prerecorded cassettes or recordings made with a SECAM video recorder produce monochrome pictures when played back with this recorder.
4. This recorder cannot be used in France. Use a SECAM recorder to record French SECAM signals.

CONTROLS, INDICATORS AND CONNECTORS

Front panel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JVC
Hi-Fi STEREO VIDEO-KASSETTEN-REKORDER HR-D470EG
VHS Hi-Fi
KOPFHÖRER
PEGEL
JVC
STOP
30
29
28
27
26
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23
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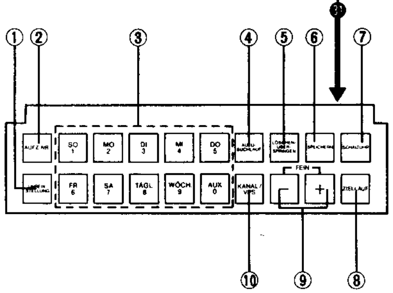
31
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③
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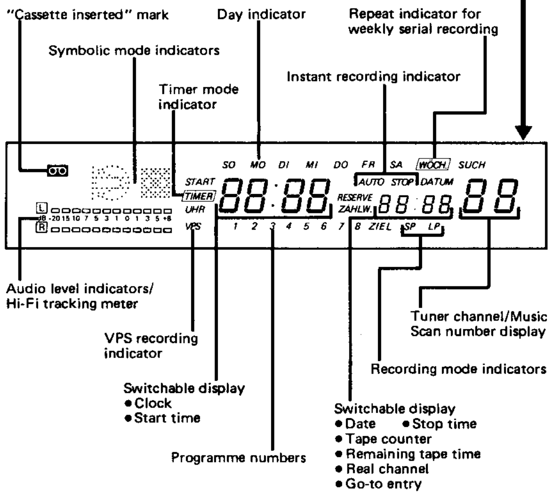
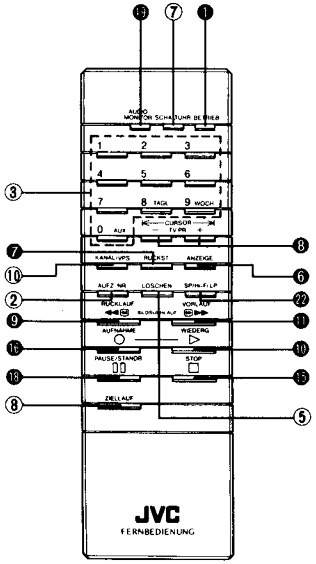

"Cassette inserted" mark
Day indicator
Repeat indicator for weekly serial recording
Symbolic mode indicators
Instant recording indicator
Timer mode indicator
SO MO DI MI DO FR SA WOCH. SUCH
START
TIMER
UHR
VPS
AUTO STOP DATUM
RESERVE
ZAHLW.
1 2 3 4 5 6 7 8 ZIEL SP LP
Audio level indicators/ Hi-Fi tracking meter
Tuner channel/Music Scan number display
VPS recording indicator
Recording mode indicators
Switchable display
● Clock
● Start time
Switchable display
● Date ● Stop time
● Tape counter
● Remaining tape time
● Real channel
● Go-to entry
Programme numbers


43
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1
③
7
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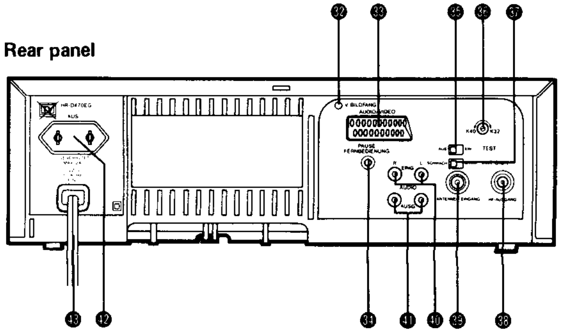
JVC
FERNBEDIENUNG

Rear panel


32
33
35
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42
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39
38

❶ **Operate button (BETRIEB) with LED indicator**
Loading a cassette also turns the power on. See page 45.

❷ **Infrared beam receiving window (FERNB. SENSOR)**

❸ **Hi-Fi audio recording level controls (AUFNAHME-AUSSTEUERUNG)**
See page 43.

❹ **LED indicators**

STEREO:	Lights when the AUDIO MONITOR button is pressed to select the stereo sound for listening.
L:	Lights when the AUDIO MONITOR button is pressed to select the hi-fi left channel sound for listening.
R:	Lights when the AUDIO MONITOR button is pressed to select the hi-fi right channel sound for listening.
NORMAL:	Lights when the AUDIO MONITOR button is pressed to select the normal soundtrack for listening.
SIMUL:	Lights when the AUFNAHME-WAHL switch is set to SIMUL.
STEREO:	Lights when a stereo programme is being received.
Bilingual: (2-KANAL)	Lights when a bilingual programme is being received.

❺ **Fluorescent display section**
The symbolic mode indicator illuminates to give quick, easy visual reference of the operating mode. Combinations of 5 different symbols indicate 12 operating modes:

PLAY:	▷	REWIND:	≪
STILL:	∥∥	FAST FORWARD:	≫
RECORD:	○	REVERSE SHUTTLE SEARCH:	▷≪
RECORD PAUSE:	○∥∥	FORWARD SHUTTLE SEARCH:	▷≫
GO-TO PLAY:	▷	MEMORY PLAY:	▷
REC MUTE:	○	REC MUTE → REC PAUSE:	○∥∥

❻ **Counter/Remain/Date button (ZÄHLWERK/RESTZT./DATUM) (ANZEIGE)**
Press to switch the middle 4-digit display among tape counter, remaining tape time and date. Can also be used to change the entire display from the Timer Set mode to the Clock mode. (See page 57.)

❼ **Reset button (RÜCKST.)**

❽ **TV programme -/+ buttons (TV PR. -/+)**
Press and hold the "+" or "-" button to quickly review channels. See page 39.
These buttons can also be used as cursor keys in the clock and timer setting modes. See page 53.

❾ **Rewind/Shuttle search button (RÜCKLAUF/BILD-SUCHLAUF)**
To rewind the tape, press this button while in the Stop mode. To view the speeded-up picture or scan musical selections in the reverse direction, press this button while in the Play mode.

❿ **Play button (WIEDERGABE)**
Press to play back the tape or cancel the Pause/Still or Search mode. Also press this button together with the *AUFNAHME button for recording.*

⓫ **Fast forward/Shuttle search button (VORLAUF/** ***BILDSUCHLAUF)***
To fast forward the tape, press this button while in the Stop mode. To view the speeded-up picture or scan musical selections in the forward direction, press this button while in the Play mode.

⓬ **Cassette eject button (KASSETTE)**

⓭ **Cassette loading slot**
Insert a VHS video cassette. See page 33.

⓮ **Instant recording button (SOFORTAUFN.)**
Use this button to start recording instantly and stop automatically after a predetermined time. See page 50.

⓯ **STOP button**
To stop the tape.

⓰ **Record button (AUFNAHME)**
Press together with the WIEDERGABE button for video and audio recording.

⓱ **Record mute button (SUCHL. MARKE)**
To make non-recorded sections (about 5 seconds) when recording music tapes. See page 55.

⓲ **Pause/Still button (PAUSE/STANDB.)**
Press to stop the tape temporarily to avoid recording of unwanted material or to view a still picture. The still picture can be advanced each time this button is pressed.

⓳ **AUDIO MONITOR button**
Each time the button is pressed, the soundtrack to be output changes and is indicated by one of the audio select indicators. See page 44.

⓴ **MIX NORMAL switch**
See page 44.

㉑ **Counter memory button (ZÄHLWERK-SPEICHER)**
See page 57.

㉒ **Recording time (AUFNAHMEZEIT) (SP/Hi-Fi LP)**
Normally set this button to the SP (Standard Play) mode ("SP" lights on the FDP) when recording. In the SP mode, both pictures and sound are recorded, allowing up to 4 hours of continuous recording with a single cassette (E-240).
When using the HR-D470EG as an audio deck, you can use the LP (Long Play) mode by pressing this button to obtain the LP indication on the FDP. In this mode, Hi-Fi audio recording is possible for up to 8 hours with a single cassette (E-240).

㉓ **Tuner sound select switch (2-KANALTON)**
Selects the desired soundtrack to be recorded on the normal audio track when recording bilingual TV programmes. Both soundtracks will be recorded on the hi-fi audio track with the main one on channel 1 and the sub soundtrack on channel 2.
Note:
Stereo programmes are recorded in stereo on the hi-fi audio track and in mono (mixed L + R) on the normal audio track regardless of the setting of this switch.

Main (HAUPT)	: To record the main soundtrack (local language).
Sub (NEBEN)	: To record the sub soundtrack (foreign language).

㉔ **Input select switch (AUFNAHMEWAHL)**
For selecting the recording input signal.

SIMUL:	To record the video signal and normal audio signal from the built-in tuner and the hi-fi audio signal from the rear panel AUDIO EING. connectors. When recording FM simulcast TV programmes, use this position.
TV:	To record signals coming from the built-in tuner.

㉕ **AC online switch (NETZAUSGANG)**

Off position (AUS)	: Power flows through the rear panel AC outlet regardless of whether the recorder is on or off.
On position (EIN)	: Power flows only when the recorder is on. When used in combination with the built-in timer, this enables timer-controlled power supply for the connected equipment. See pages 36 and 37.

㉖ **Level indicator switch (PEGELANZEIGE)**
See page 43.

㉗ **Tracking control (SPURLAGE)**
See page 43 or 46.

㉘ **Picture sharpness control (BILDSCHÄRFE)**
Turn this knob clockwise to make the picture sharper. Turn counterclockwise to give the picture a softer tone. Effective only for playback pictures. (No effect for recording.)

㉙ **Headphone level control (PEGEL)**
Adjusts the level of audio output from the KOPFHÖRER jack.

㉚ **Headphone jack (KOPFHÖRER)**
Connect a set of headphones for monitoring or private listening.

㉛ **Sub control panel**

① **Clock adjust button (UHREINSTELLUNG)**
Press this button for clock setting. See page 41.

② **Programme button (AUFZ. NR.)**
Press this button when you want to preset the timer for unattended recording. See page 51.

③ **Multi-purpose numeric keys**

Clock setting:	See page 41.
Channel selection:	See page 39.
Timer programming:	See page 51.
Music Scan:	See page 55.
Counter Go-To.	See page 56.

The "0" key also functions as the AUX mode select button. To record from a source connected to the rear panel AUDIO/VIDEO socket, obtain "0" in the channel display by pressing the "0" key.

④ **Search button (AUTO-SUCHLAUF)**
Press this button to initiate automatic scan tuning in the Real-channel mode. (See pages 39 and 40.)

⑤ **Cancel/Skip button (LÖSCHEN/ÜBERSPRINGEN)**
A dual-purpose switch. Use to clear the programmed data in the Timer Set mode or skip unnecessary channels in the Channel Set mode. The CANCEL button on the remote control unit only functions in the Timer Set mode. (See page 40 or 52.)

⑥ **Store button (SPEICHERN)**
Press to store necessary channels. (See page 40.)

⑦ **Timer button (SCHALTUHR)**
Press to engage the Timer Recording Standby mode after you have preset the timer for unattended recording. See page 51.

⑧ **Go-to button (ZIELLAUF)**
Press to engage the Counter Go-To mode. See page 56.

⑨ **Fine (-/+) buttons (FEIN -/+)**
To fine-tune to a certain station by shifting the frequency in either direction. (See page 40.)

⑩ **Channel/VPS button (KANAL/VPS)**
Press to engage the Real Channel mode (see page 39) or to engage the VPS recording standby mode (see page 53).

Rear panel

㉜ **V. lock adjustment screw (V-BILDFANG)**
When operating in the Still mode, adjust this screw to eliminate any vertical vibration of the picture, by using a screwdriver.

㉝ **AUDIO/VIDEO socket**
A 21-pin standardised audio/video input/output socket for the connection to a stereo TV equipped with the same type of socket. The input from this socket can be recorded in the AUX mode with "0" in the channel display. The audio output can be selected with the MIX NORMAL switch and the AUDIO MONITOR button.

㉞ **Pause remote control terminal (PAUSE FERNBEDIENUNG)**
When using a JVC video camera, connect the remote control cable of the camera adapter to this terminal for the purpose of controlling the starting and stopping of the tape with the camera's start/stop switch.

㉟ **Test signal switch (TEST)**
Set to EIN when tuning your TV receiver for the video channel. A test signal in the form of two vertical white bars will be available.

㊱ **RF converter frequency adjustment screw**
See page 38.

㊲ **Attenuator switch (ANT. SIGN.)**
Set to SCHWACH to receive broadcasts from distant stations. Set to STARK to receive broadcasts of high field strength. Use a screwdriver for setting this switch.

㊳ **RF output connector (HF-AUSGANG)**
Connect to the aerial connector of a TV receiver through the aerial cable (provided).

㊴ **Antenna input connector (ANTENNEN-EINGANG)**
Connect an aerial to this connector.

㊵ **Audio input connectors (AUDIO EING.)**
Connect an audio tape recorder or other audio sources for recording sound. The input from these connectors can be recorded on the hi-fi track when the AUFNAHMEWAHL switch is set to SIMUL.

㊶ **Audio output connectors (AUDIO AUSG.)**
Both hi-fi and normal audio signals can be obtained from these connectors. The output can be selected with the MIX NORMAL switch and the AUDIO MONITOR button.

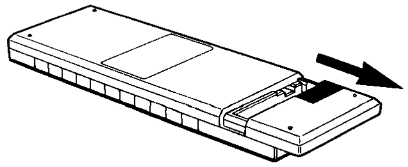
㊷ **AC outlet (GESCHALTET)**
Connect the power cord of other audio or video equipment (such as an FM tuner) requiring less than 2 amperes of power.
This outlet is controlled by the NETZAUSGANG switch. When the NETZAUSGANG switch is set to AUS, this outlet supplies power (220 V∿, 50/60 Hz) regardless of the BETRIEB switch setting as long as the power cord of the HR-D470EG is plugged in.
When the NETZAUSGANG switch is set to EIN, this outlet supplies power only when the recorder is on.

㊸ **Power cord**

Infrared remote control unit

The infrared remote control unit gives you full operation control from your viewing position. The maximum operating distance is about 8 m.
Buttons with the same reference numbers as the recorder's buttons have the same functions.
Note: The numeric keys on the remote control do not function for clock setting.

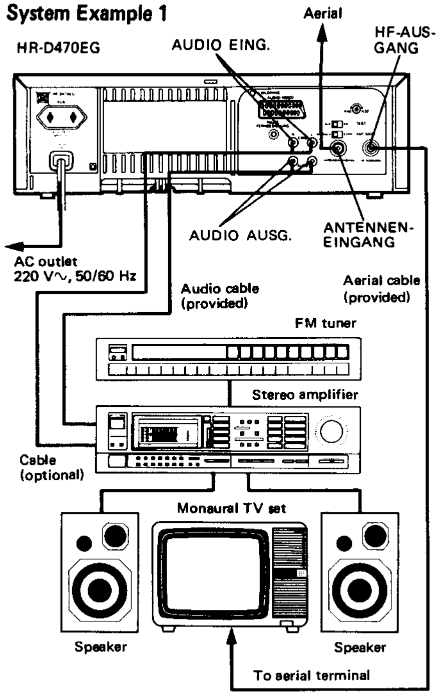
Installing the batteries
1. Slide the battery compartment cover on the rear of the unit in the direction of the arrow (►).



2. Insert 2 "R03" -size batteries (provided) in the correct directions into the battery compartment.
3. Replace the cover.

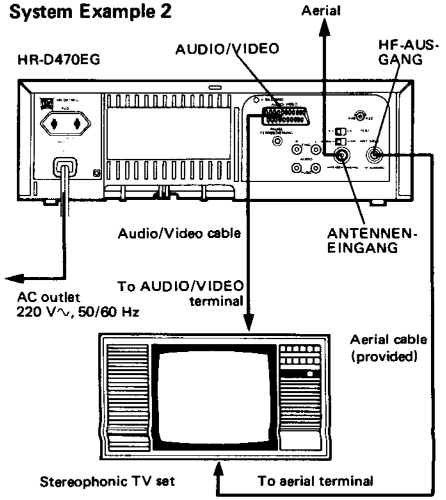
CONNECTIONS

System Example 1



Aerial
HR-D470EG
AUDIO EING.
HF-AUS-GANG
AUDIO AUSG.
ANTENNEN-EINGANG
AC outlet
220 V∿, 50/60 Hz
Audio cable (provided)
Aerial cable (provided)
FM tuner
Stereo amplifier
Cable (optional)
Monaural TV set
Speaker
Speaker
To aerial terminal

System Example 2



Aerial
HR-D470EG
AUDIO/VIDEO
HF-AUS-GANG
Audio/Video cable
ANTENNEN-EINGANG
AC outlet
220 V∿, 50/60 Hz
To AUDIO/VIDEO terminal
Aerial cable (provided)
Stereophonic TV set
To aerial terminal

Procedure

1. Remove the aerial cable from the TV receiver and reconnect to the HR-D470EG.
2. Connect the HR-D470EG to the TV receiver using the aerial cable (provided).
3. Connect the AUDIO EING. L and R connectors of the HR-D470EG to the recording output terminals of the amplifier. (Exactly as one hooks up an audio cassette deck.)
4. Connect the AUDIO AUSG. L and R connectors of the HR-D470EG to the AUX or TAPE MONITOR input terminals of the amplifier.

Notes:

- Observe L and R when connecting the audio input and output connectors of the HR-D470EG to a stereo amplifier.
- If stereo or bilingual TV broadcasts are receivable in your area, this recorder can record them independently of the TV set and play them back through the connected audio system.
- When listening to sound from the connected stereo system, turn down completely the sound volume of the TV receiver.
- Listening to stereophonic sound is also possible using stereo headphones connected to the front panel KOPFHÖRER jack.
- With this setup, you can enjoy prerecorded Hi-Fi VHS video tapes in hi-fi stereo while viewing them on a regular TV receiver, and also you can record FM simulcast television programmes with hi-fi audio accompaniment. See page 48.
- If you want to timer-control the recording of FM simulcast programmes, connect the tuner's power cord to the HR-D470EG's AC outlet. Set the NETZAUSGANG switch to EIN, and both the tuner and the HR-D470EG will be switched on at a time preprogrammed by the HR-D470EG. Timer-controlled recording of FM simulcast programmes is not possible with the type of tuners which reset the channel each time the power is switched off.

For customers who own a stereo TV equipped with a standardised audio/video socket

By connecting the 21-pin AUDIO/VIDEO socket of the HR-D470EG to your TV's audio/video socket, it is possible to play stereo tapes through the TV's speakers. In this case, use the A/V mode specified on your TV, instead of UHF channel 36.

CAUTION

- The HR-D470EG has a dynamic range of more than 80 dB with regards to its hi-fi audio capability. It is recommended that you check the maximum level if you are going to listen to the hi-fi audio signals through a stereo amplifier. A sudden surge in speaker input may cause speaker damage.
- Some speakers and televisions are specially shielded to prevent television interference. If both are of the non-shielded type, do not place the speakers adjacent to the TV set, otherwise the video playback picture will not be normal because of mutual interference.

VIDEO CHANNEL SETTING

ATTENTION

To view video programmes through the HF-AUSGANG terminal, you must set the TV's channel selector to the output channel of the RF converter. To view video programmes through the AUDIO/VIDEO socket, use the A/V mode specified on your TV.

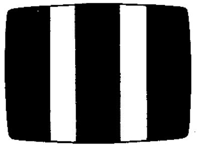
The signal from the RF converter is viewed through a vacant channel not used for broadcasting. The converter channel of all units is set to UHF channel 36 prior to shipment. Setting your TV receiver to UHF channel 36 may provide video playback. However, to obtain the best possible reproduction on your TV receiver, accurate adjustment to the RF converter output is required.

Procedure

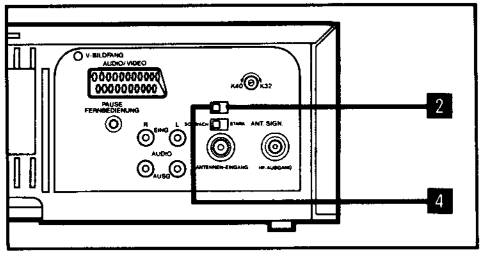
1 Turn on the recorder by pressing the front panel BETRIEB button. Turn on the TV receiver.

2 Set the TEST switch to EIN.

3 Adjust your TV receiver in the vicinity of UHF channel 36 until you bring in the two white signal bars on the screen as illustrated. This setting is now the VIDEO CHANNEL of the TV receiver to which the HR-D470EG is connected.



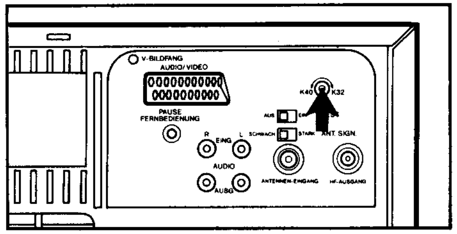
4 Reset the TEST switch to AUS.



V-BILDFANG
AUDIO/VIDEO
K40
K32
PAUSE FERNBEDIENUNG
R
L
EING
SCHWACH
STARK
ANT. SIGN.
AUDIO
AUSG
ANTENNEN-EINGANG
HF-AUSGANG
2
4

Notes:

- When you adjust your TV receiver to channel 36 for video playback, if some interference noise is seen on the screen because of broadcasts on neighbouring channels or if your preset broadcasts should be affected in picture quality, it is necessary to shift the RF converter output frequency from that of channel 36.



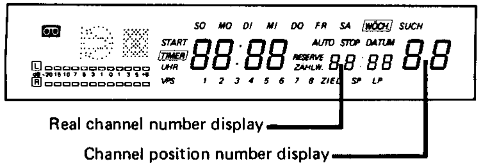
V-BILDFANG
AUDIO/VIDEO
K40
K32
PAUSE FERNBEDIENUNG
R
L
EING
AUS
SCHWACH
STARK
ANT. SIGN.
AUDIO
AUSG
ANTENNEN-EINGANG
HF-AUSGANG

For this purpose, insert a screwdriver into a hole provided on the rear of the set and re-adjust the RF converter frequency adjustment screw in minute steps. Then tune the TV receiver once again until a clear picture is obtained. This adjustment requires extreme precision and must be done with the utmost care. We recommend that you consult your JVC dealer for making this adjustment.

- No signal is available from the AUDIO/VIDEO socket while the test signal is being used.
- If a prerecorded VHS cassette is available, TV adjustment for VIDEO CHANNEL setting is also possible using it to obtain a playback picture. Insert the cassette and operate the HR-D470EG for playing back the cassette. Then tune the TV receiver to obtain clear pictures and sound while monitoring the playback picture on the TV screen.
- If your TV receiver is not provided with an AFC circuit, perform fine tuning of the TV receiver when you are actually viewing video cassettes.

OPERATING THE BUILT-IN TUNER

The HR-D470EG incorporates an advanced frequency synthesizer tuner which is pretuned to 112 channels to cover VHF, UHF and CATV broadcasts. Channel indication is given in two different ways: real channel numbers and channel position numbers. Real channel number indication is available by pressing the KANAL/VPS button on the sub control panel, while channel position number indication is always available in the channel display.



SO MO DI MI DO FR SA WOCH SUCH
START
TIMER
UHR
VPS
AUTO STOP DATUM
RESERVE
ZAHLW.
ZIEL
SP LP
1 2 3 4 5 6 7 8
Real channel number display
Channel position number display

Correspondence between 112 pretuned TV stations and the HR-D470EG's real channel indications

DISPLAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
Ch	–	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	A	B	C	D	E	F	G
CC	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19
DISPLAY	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**
Ch	H	E21	E22	E23	E24	E25	E26	E27	E28	E29	E30	E31	E32	E33	E34	E35	E36	E37	E38
CC	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	S31	S32	S33	S34	S35	S36	S37	S38
DISPLAY	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**
Ch	E39	E40	E41	E42	E43	E44	E45	E46	E47	E48	E49	E50	E51	E52	E53	E54	E55	E56	E57
CC	S39	S40	S41	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
DISPLAY	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**		**75**	**76**	**77**			
Ch	E58	E59	E60	E61	E62	E63	E64	E65	E66	E67	E68	E69		–	–	–			
CC	–	–	–	–	–	–	–	–	–	–	–	–		X	Y	Z			

Stored channels

A total of 112 channels are receivable. Of them, up to 32 can be stored for easy channel selection. Prior to shipment, some channels are stored.

It is possible to store more channels or skip some channels if there are no broadcasts on those channels in your area. It is possible to change the stored channels to correspond to your preferred channel allocation. Skipped channels can be restored whenever necessary.

- Channel memories are permanent; the programmed channel allocation will not be erased even if the recorder is unplugged from the AC outlet.

Channel selection

To select a channel for recording, normally use the TV PR. (or TV PR. on the remote control) -/+ buttons or 10 numeric keys. You can choose any channel from among the stored ones by calling up the corresponding channel position number.

- Use the TV PR. "-" button to scan to channel in the direction of decreasing numbers; the TV PR. "+" button, in the direction of increasing numbers.
- When using the 10 numeric keys, pay attention to the following: When 1, 2 or 3 is entered, it blinks for about 2 seconds. To set channel 1, 2 or 3, leave it blinking until it remains lit. To key in a two-digit number, enter the 2nd number while 1, 2 or 3 is blinking. The number entered first will be shifted to the tens place and channels 10 to 32 can be set. If you enter an invalid number (larger than 32), the channel display will return to the previous figure after 2 seconds.

If you want to select a channel other than those stored, engage the Real Channel mode and call up a channel while referring to the real channel number display.

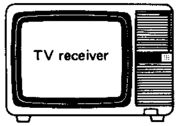
With recorder's controls:

- Press the KANAL/VPS button to engage the Real Channel mode and call up a channel by either pressing the AUTO-SUCHLAUF button or using the 10 numeric keys.

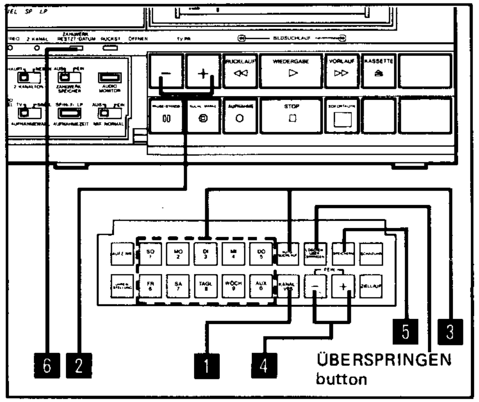
With remote control:

- Press the KANAL/VPS to engage the Real Channel mode and call up a channel by using the 10 numeric keys.

Changing the stored channels

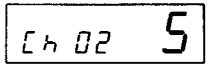


Turn the TV receiver to ON and adjust it to your video channel.

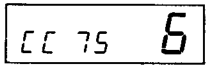


1 Press the KANAL/VPS button.

The middle 4-digit display will change to the Real Channel mode and show the band and real channel number of a station stored for that position.



VHF channel 2 is stored for channel position 5.



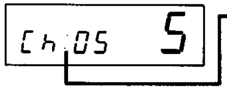
Cable channel 75 is stored for channel position 6.

2 Call up the channel position number for which you wish to change the stored TV station.

- For this purpose, press either the TV PR. "-" or "+" button. Channel positions from 0 to 32 appear successively. "0" indicates that the unit is in the external input mode usually referred to as AUX.

3 Select a TV station which you wish to store into that position.

- Pressing the KANAL/VPS button changes the band and alternates the band indication between "Ch" (for VHF and UHF) and "CC" (for Cable). Select the appropriate indication.
- You can scan to the real channel number corresponding to the desired station by pressing the AUTO-SUCHLAUF button. Pressing the AUTO-SUCHLAUF button initiates automatic scanning from real channel number Ch 02 to 69, CC 01 to 41, 75, 76, 77, then back to Ch 02. When a broadcast is detected, scanning stops automatically. To advance to the next station, press the AUTO-SUCHLAUF button. When the button is held pressed, scanning is performed in the reverse direction while the button is being pressed.

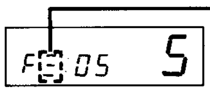


"Colon" will appear to indicate that this real channel is not stored for the indicated channel position.

- You can key in that real channel number using 10 numeric keys. 70, 71, 72 73, 74 and numbers larger than 77 are invalid numbers. If an invalid number is keyed in, the previously selected channel will be received.

4 If the picture quality is unsatisfactory due to ghosts or other noise, perform fine tuning.

- For this purpose, press either the FEIN "-" or "+" button. The Fine Tuning mode will be engaged.



Upper or lower "-" sign indicates the operating tuning frequency is above or below the standard broadcast frequency. Centre "-" sign will appear when it corresponds to the standard.

Then press either the FEIN "-" or "+" button, depending on the direction of fine adjustment, so that the picture clears up. Each time the button is pressed, the picture condition changes in a single increment. Continuous changing is also possible by keeping the button pressed. If the tuning frequency falls on the next station, the channel number advances as well. If no command is given for 2 seconds after either FEIN button has been pressed, the Fine Tuning mode will be automatically cancelled. To cancel the Fine Tuning mode instantly, press the KANAL/VPS button.

- If the picture is not clear after all procedures, perform fine tuning on your television.
- Distorted pictures or sound will be recorded if fine tuning has not been properly performed. Exercise care with this adjustment since the recorded picture and sound cannot be adjusted later.

5 After confirming both the real channel number and channel position number, press the SPEICHERN button. "Colon" will disappear.

- The selected station will be stored in memory.

6 Press the ZÄHLWERK/RESTZT./DATUM button to disengage the Real Channel mode.

Skipping the stored channels

1. Call up the channel position number that you wish to skip by using the TV PR. buttons or 10 numeric keys.
2. Press the KANAL/VPS button.
3. Press the ÜBERSPRINGEN button.
   "Colon" will appear to indicate that the displayed real channel is not stored.
4. To disengage the Real Channel mode, press the ZÄHLWERK/RESTZT./DATUM button.
   - The skipped channel number will not appear on the channel display during up/down scan tuning.

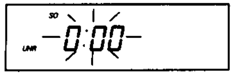
Restoring the skipped channels

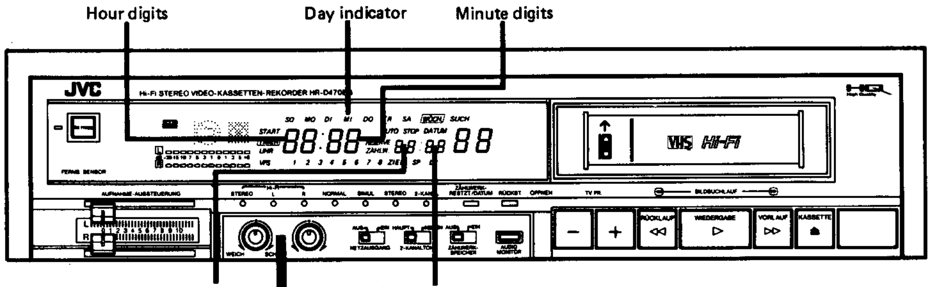
1. Press the KANAL/VPS button to engage the Real Channel mode.
   - In this mode, all channel position numbers 1 through 32 are available in the channel display.
2. Select the channel position number that you wish to restore by using the TV PR. "-" or "+" button.
3. Select a real channel that you wish to restore in that channel position by using the AUTO-SUCHLAUF button or 10 numeric keys.
4. After confirming both the real channel number and channel position number, press the SPEICHERN button.
5. To disengage the Real Channel mode, press the ZÄHLWERK/RESTZT./DATUM button.

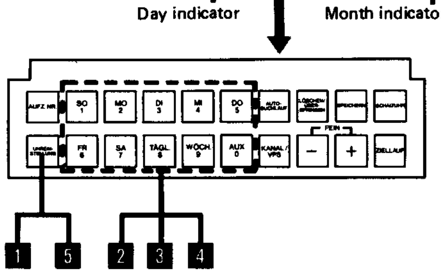
CLOCK SETTING

Plug the HR-D470EG into an AC outlet. The display shows a flashing 0:00 with SO and UHR illuminated. This initial display also functions as a power failure indicator.

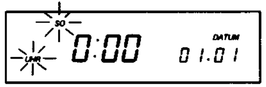
Power failure indicator



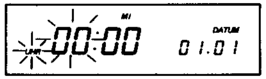




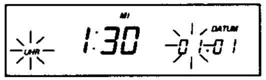
1 Press UHREINSTELLUNG.
The display will change to the Clock Set mode with "SO" and "UHR" flashing.



2 Press one of the numeric keys "1 (SO)" to "7 (SA)" that corresponds to the day of setting. The hour digits will start flashing.

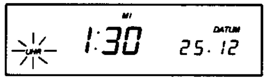


3 Set the hour and minute in that order.



- The flashing position is ready for entry.
- To set a one-digit number, first press "0", then press the numeric key for 1 to 9.
- Zero will not be displayed in the tens place of the hour indication unless the cursor is moved back to the hour digits.
- For a two-digit number, simply press the corresponding numeric keys in the right order.
- In hour setting, numbers larger than 23 will be rejected.
- In minute setting, numbers larger than 59 will be rejected.

4 Set the day and month in that order.
- The flashing position is ready for entry.
- The setting method is the same as for time setting.
- In day setting, invalid numbers such as 32 of January or 30 of February will be rejected.
- In month setting, numbers larger than 12 will be rejected.



5 Press UHREINSTELLUNG.
- Press it at the exact instant of the time signal, and the clock will be set accurately to the present time.

Notes:
- If you press a wrong numeric key, you can return to the previous position using the reverse cursor key TV PR. [−].
- Once all necessary data have been entered, you can reach any position for correction using the reverse and forward cursor keys TV PR. [−] [+].
- Readjust the date in leap years.

Clock/timer memory backup
- The built-in memory backup battery allows for correct time-keeping for about 60 minutes after the recorder is unplugged from the AC outlet. During this period of power outage, the preprogrammed timer data are also maintained, although the display blacks out.
- The memory backup battery is being recharged when the recorder is not in use. For the fully-depleted battery to be recharged sufficiently for 60-minute backup, it takes more than 30 minutes.
- When the backup time is expired, the power failure indicator shown above will appear when power is reapplied.

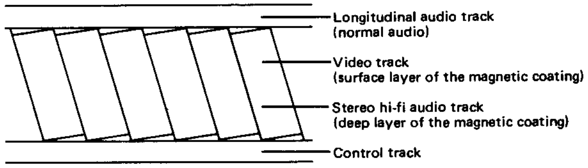
INFORMATION ON THE HR-D470EG'S AUDIO SYSTEM

Hi-Fi and normal audio

To provide true hi-fi audio accompaniment to video entertainment and, at the same time, compatibility with regular VHS tapes, the HR-D470EG employs a unique audio recording system. Hi-fi audio signals (2-channel) are recorded deep into the tape's magnetic coating, and the video signal is recorded on top of the audio signals in a shallower layer. At the same time, another audio head records normal audio signals (monaural) onto the usual longitudinal audio track. Since this longitudinal audio track is exactly the same as on regular VHS tapes, tapes recorded on the HR-D470EG can be played back on other VHS machines, and vice versa.

CAUTION:
The hi-fi soundtrack recorded with the HR-D470EG cannot be reproduced with video equipment other than Hi-Fi VHS.

Tape pattern recorded with the HR-D470EG



Hi-fi audio recording and reproduction are available only from the hi-fi audio track while the longitudinal audio track provides normal audio.

The hi-fi and normal soundtracks are recorded simultaneously.

Recording options according to the selected input mode

Track / Input mode	Video track	Normal audio track (mono)	Hi-fi audio track (2-channel)
TV	TV picture (from built-in tuner)	TV sound (from built-in tuner)	
SIMUL	TV picture (from built-in tuner)	TV sound (from built-in tuner)	Audio signal from AUDIO EING.
AUX 0 Channel display section	Video signal from AUDIO/VIDEO	Audio signal from AUDIO/VIDEO	

Notes:
- To engage the AUX mode, press the "0" key of the 10-digit keypad.
- For audio-only recording, refer to page 49.

Recording options according to the type of broadcasts and the setting of the 2-KANALTON switch

Audio Track / 2-KANALTON switch position / Type of broadcast		Normal audio track (mono)	Hi-fi audio track (2-channel)	
			L	R
Regular (monaural audio)	Either position	Mono	Mono	Mono
Stereo broadcast	Either position	L + R mixed	Stereo	
Bilingual broadcast	HAUPT HAUPT NEBEN 2-KANALTON	Main soundtrack (local language)	Main soundtrack (local language)	Sub soundtrack (foreign language)
	NEBEN HAUPT NEBEN 2-KANALTON	Sub soundtrack (foreign language)		

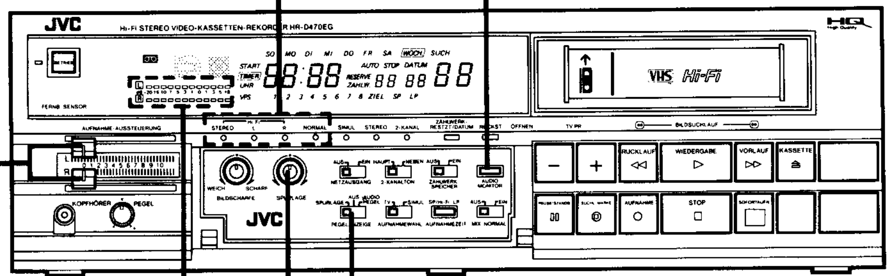
Hi-Fi audio recording level adjustment

While recording onto the normal audio track is controlled by the built-in Automatic Level Control circuit, hi-fi audio recording is controlled manually.

AUFNAHME-AUSSTEUERUNG controls
Slide these controls, the upper for left channel and the lower for right channel, for manual adjustment of the hi-fi audio recording level.

AUDIO MONITOR button

Audio select indicators



Audio level indicators
For manual control of the recording level, first set the relevant switches as follows:

PEGELANZEIGE → EIN
AUDIO MONITOR → Hi-Fi STEREO

Then slide the AUFNAHME-AUSSTEUERUNG controls referring to these indicators. When indicators up to or near 0 dB light for the loudest signal being applied, the recording level is optimum. (The level at which only one red indicator lights from time to time may be most appropriate.)
During playback, these indicators show the level of audio signals recorded on the tape and selected with the AUDIO MONITOR button.
If no signal is recorded on the hi-fi audio track, the level of normal audio is automatically indicated.
These indicators do not light when the PEGELANZEIGE switch is in the AUS position.

Notes:

- With the AUDIO MONITOR select button set for L, R or NORMAL, the recording level of hi-fi audio signals cannot be correctly indicated. Select the Hi-Fi STEREO position when adjusting the recording level.
- The normal audio signal level is also displayed by these indicators, but cannot be adjusted.

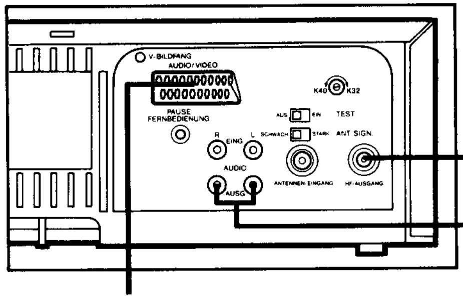
PEGELANZEIGE switch and SPURLAGE control
The right-channel audio level indicator also functions as a tracking meter during playback. If noise or breaks are sensed in the reproduced sound from the hi-fi audio track or noise bars are visible on the screen, attempt to correct using the SPURLAGE control while referring to the meter. For this purpose, set this switch to Hi-Fi SPURLAGE and turn the SPURLAGE control so that the greatest number of elements of the right-channel indicator light.
When this switch is set to AUS, the indicators do not light, regardless of whether during recording or playback.

Note:

- When playing back a tape with no recording on the hi-fi audio track, the level indicator does not light when the PEGELANZEIGE switch is set to SPURLAGE.

Dual-audio playback flexibility

Two different types of audio tracks (hi-fi and normal) allow a variety of playback options depending on the connection and the settings of relevant controls and switches.



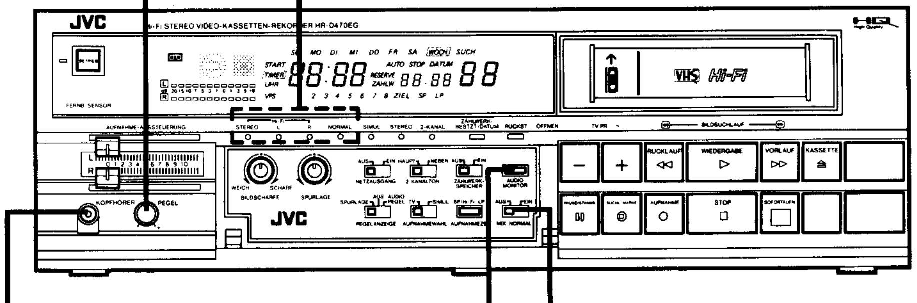
HF-AUSGANG connector
Delivers audio (both hi-fi and normal) and video signals to a TV receiver. When the recorder is not used, the antenna signal is supplied from this connector to the TV receiver to allow regular TV viewing; when a video tape is played back through the HF-AUSGANG connector, the audio is reproduced always as monaural; with hi-fi stereo tapes, both channels are mixed or the one selected by the AUDIO MONITOR button is reproduced. Therefore, for stereo playback, connect a stereo system to the AUDIO AUSG. connectors or a stereo television to the AUDIO/VIDEO socket.

AUDIO/VIDEO socket
Delivers audio (both hi-fi and normal) and video signals. (Also accepts audio and video signals for recording from other video equipment.)

AUDIO AUSG. connectors
Delivers the audio signals from both hi-fi and normal audio tracks.

Headphone level control

Audio select indicators



KOPFHÖRER jack
Delivers the audio signals from both hi-fi and normal audio tracks. The headphone output level is adjustable with the headphone level control.

AUDIO MONITOR button
Selects the hi-fi audio channel (left, right or both) or the normal soundtrack for listening. Use this button together with the MIX NORMAL switch referring to the four indicators (Hi-Fi STEREO, L, R and NORMAL).

- Set to Hi-Fi STEREO to listen to a stereo soundtrack.
- Set to L to listen to the hi-fi left channel sound.
- Set to R to listen to the hi-fi right channel sound.
- Set to NORMAL to listen to the normal sound.

Note:

- This button functions during recording as well, although it has no effect on the recorded signal.

MIX NORMAL switch
Operates in conjunction with the AUDIO MONITOR button to select soundtracks for listening.

- Set to EIN to listen to a mixture of Hi-Fi and normal soundtracks by selecting the combination with the AUDIO MONITOR button.

Notes:

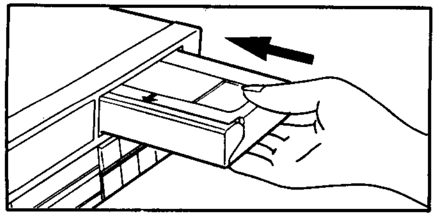
- This switch functions during recording as well, although it has no effect on the recorded signal.
- When playing back a tape containing the same soundtrack on both hi-fi and normal audio tracks, a slight time lag is sensed between the two soundtracks, probably with some distortion, in the EIN position. Therefore, in such a case, use the AUS position.
- Set to AUS to listen to each soundtrack independently by selecting it with the AUDIO MONITOR button.

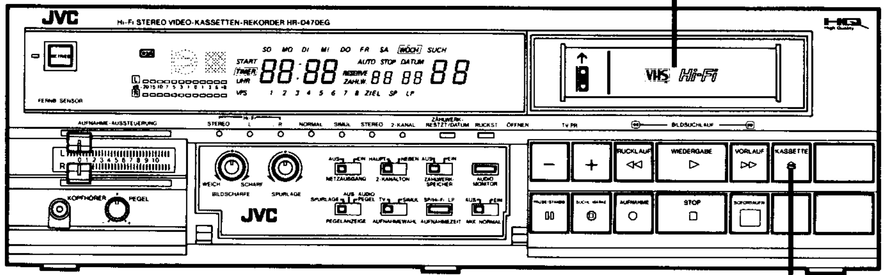
LOADING AND UNLOADING A CASSETTE

Loading

Insert a cassette endways, with the small arrow on the cassette pointing to the left.

- With a cassette inserted, the ▭ mark to indicate "cassette inserted" appears on the FDP. Even after the power is turned off, this mark remains lit as long as the cassette is inside the recorder.





New motorised loading system/Auto-play function

- As long as the AC power cord is plugged in, the cassette can be loaded even when the power has not been turned on. Inserting a cassette into the loading slot turns the power on automatically.
- Inserting a cassette, with its safety tab removed, turns the recorder on and playback of the cassette begins automatically.
- The cassette can be unloaded even when the power has been turned off. If a cassette is inside, pressing the KASSETTE button turns the power on automatically and, after ejection of the cassette, shuts it off automatically.

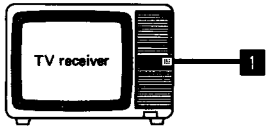
Unloading

Press KASSETTE.
The cassette will be ejected.

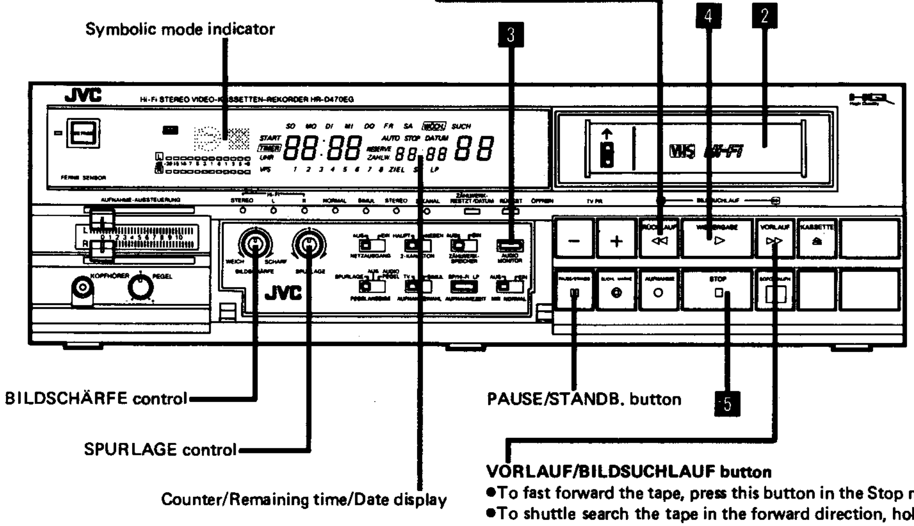
Notes:
- Be sure to insert the cassette firmly into the slot; otherwise, it will be automatically ejected.
- The automatic loading mechanism will operate only when the cassette is inserted correctly.
- A cassette inverted cannot be inserted.

CAUTION
- If unloading of a cassette is not possible, check to see whether the TIMER indicator is lit. If so, press the SCHALTUHR button so the TIMER indicator extinguishes.
- Do not attempt to pull out the cassette once automatic loading has started.
- Do not insert fingers or any foreign object beyond the door flaps of the cassette loading slot, as this could lead to injury or damage to the mechanism. Show special caution with children.

PLAYING BACK A VIDEO CASSETTE



RÜCKLAUF/BILDSUCHLAUF button
- To rewind the tape, press this button in the Stop mode.
- To shuttle search the tape in the reverse direction, hold this button pressed in the Play mode.
- The search speed is 9 times normal.



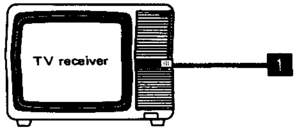
VORLAUF/BILDSUCHLAUF button
- To fast forward the tape, press this button in the Stop mode.
- To shuttle search the tape in the forward direction, hold this button pressed in the Play mode.
- The search speed is 9 times normal.

1 Switch ON.
Adjust the TV receiver's channel to your video channel.
2 Load a pre-recorded cassette. Power will be switched on automatically. When the cassette loaded has no safety tab, playback will start automatically.
3 Set the AUDIO MONITOR button as required (also check the MIX NORMAL switch). See page 44.
4 Press WIEDERGABE.
5 Press STOP at the end of the programme.

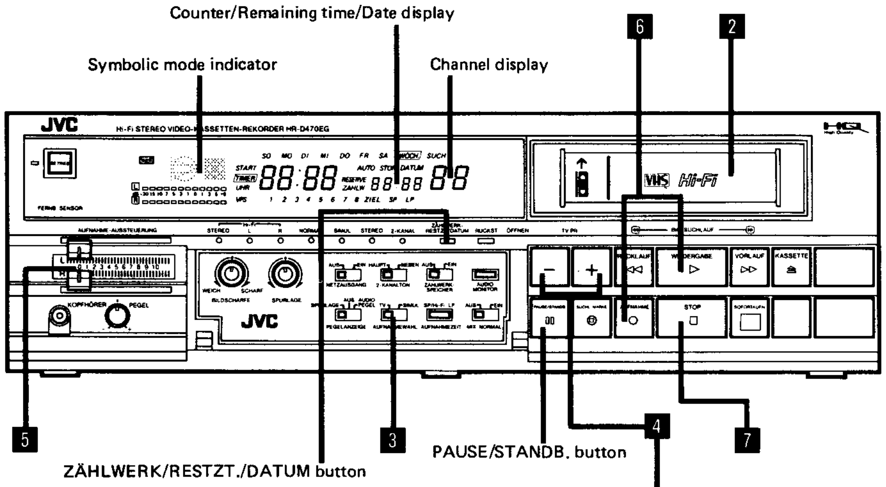
Memory play function
- If you want to watch the same tape again from the beginning, press the WIEDERGABE button within 2 seconds after you have pressed the RÜCKLAUF button. Playback will start automatically after the tape has been rewound to the beginning. In this case, while the tape is being rewound, the symbolic mode indicator for WIEDERGABE will be blinking.
- When used in conjunction with the counter memory function, this memory play is also available at the counter reading of "0000" after either rewind or fast forward. (For more details of the counter memory function, refer to page 57.)

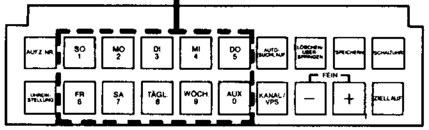
Notes:
- The AUFNAHMEZEIT switch may be in either position. The SP or LP mode recording is automatically detected and played back at a correct speed respectively. The engaged mode will be displayed on the FDP.
- With LP mode recordings, only the audio portion is reproduced.
- The tape-end auto-rewind mechanism functions in both the Play and Fast Forward modes.
- When the PAUSE/STANDB. button is pressed during playback, a still picture will appear. The still picture can be advanced each time this button is pressed. To cancel the Still mode, press the WIEDERGABE button.
- Images on the screen can be adjusted to a preferred softer or sharper definition by turning the BILDSCHÄRFE control in the corresponding direction.
- When the Still mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.
- Noise bars may appear on the screen if you playback a tape which was recorded using another recorder. In such cases, adjust the SPURLAGE control. Turn it in either direction to adjust the picture. After playing a particular tape, return the control knob to the centre position.
- With some televisions, the still picture may be unstable. This is not due to any defect of the unit.
- When listening through headphones, if the volume is too weak or too loud, adjust the headphone level control for comfortable listening.

BASIC OPERATION FOR RECORDING TV PROGRAMMES



This section describes the step-by-step procedure for recording a TV programme while watching it, assuming that it is a regular (monaural audio) programme.
For other recording options, refer to the next page where variations from this basic operation are described.





1 Switch on the TV receiver and adjust its channel to your video channel.
2 Load a cassette. Power will be switched on automatically.
3 Set AUFNAHMEWAHL to TV.
4 Select the channel you wish to record.
5 Hi-Fi audio recording level adjustment. Refer to page 43.
6 Press AUFNAHME and WIEDERGABE simultaneously to start recording.
7 Press STOP at the end of the programme.

CAUTION
Check to see if the "LP" indicator on the FDP is lit. If so, press the AUFNAHMEZEIT button to obtain "SP" on the FDP, otherwise the pictures will not be recorded.

Notes:
- If there is part of the programme you don't want to record, press the PAUSE/STANDB. button. A white bar appears on the TV screen to keep the user aware the unit is in the Pause mode. To release the Pause mode, press the WIEDERGABE button.
- When recording is restarted from the Pause mode, assemble recording is performed so that the playback picture will not distort at the edit point. A few frames recorded before the pause are erased due to overlap of the new recording. This is not due to any defect of the unit.
- When a recording containing assemble edits (segments recorded using the PAUSE function) is played back, noise may appear momentarily at edit points. This is not due to any defect of the unit.
- When the Pause mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.
- The built-in tuner's automatic channel lock mechanism prevents the selected channel from being altered during recording. Therefore, if you wish to change the channel during recording, first engage the Pause mode and then select a different channel.
- If the AUFNAHME button cannot be engaged, check to see if the cassette safety tab has been removed. (See page 33.)
- When the end of the tape is reached during recording, the tape is automatically rewound to the beginning and stops.
- Press the ZÄHLWERK/RESTZT./DATUM button to check how much recording time has elapsed. (For more details refer to page 57.)

RECORDING A TV PROGRAMME WHILE WATCHING ANOTHER

A programme not being viewed can be recorded while you enjoy another programme. This permits the recorded programme to be played back later at your convenience.
The recording procedure is exactly the same as described on the previous page. The points to be remembered are:
- Select the channel you wish to record with the recorder's channel select buttons.
- Select the channel you wish to view with the TV receiver's channel selector.

RECORDING STEREO TV PROGRAMMES

If stereo TV programmes are broadcast in your area, the HR-D470EG automatically receives them in stereo. When a stereo programme is being received, the STEREO indicator lights and recording is made in stereo on the hi-fi audio track and in mono (mixed L + R) on the normal audio track. To listen to the stereo soundtrack during recording, set the AUDIO MONITOR button for Hi-Fi STEREO. If this button is left either in the L or R position, you will hear only one channel while recording, though the recording is being made in stereo.

RECORDING BILINGUAL TV PROGRAMMES

When a bilingual TV programme is being received, the 2-KANAL indicator lights. There is a switch to select the soundtrack to be recorded on the normal audio track, however, because both soundtracks are recorded always on the hi-fi track for selective listening, you can ignore the switch labelled 2-KANALTON in most cases unless you need a specific soundtrack on the normal audio track.
- Set the 2-KANALTON to HAUPT to record the main soundtrack (local language); to NEBEN to record the sub soundtrack (foreign language).
- To listen to the selected soundtrack from the hi-fi audio track while recording, set the AUDIO MONITOR button for either L or R.
- To listen to the soundtrack being recorded on the normal audio track, set the AUDIO MONITOR button for NORMAL.

RECORDING FM SIMULCAST TV PROGRAMMES

FM simulcast TV programmes can be recorded using an FM stereo tuner. Connect necessary components. (Connect the FM tuner to the rear panel AUDIO EING. connectors.) Select the TV channel broadcasting the simulcast programme with the recorder's channel select buttons and tune the FM stereo tuner to the station broadcasting the soundtrack for this TV programme.
The only difference from the basic recording procedure is in step **3**.
- Set the AUFNAHMEWAHL switch to SIMUL.
  Then the SIMUL indicator will light. With this setting, the video and audio signals from the built-in tuner will be recorded on the video and normal audio track and the audio signal from the FM stereo tuner will be recorded on the hi-fi audio track.

Notes:
- After finishing recording, be sure to set the AUFNAHMEWAHL switch to TV.
- While recording simulcast programmes, it might happen that the hi-fi sound distorts momentarily at switching points between different programmes. This is not due to any defect of the unit.

RECORDING A TV PROGRAMME WHILE RECORDING AN INDEPENDENT AUDIO SOURCE

Using the "simulcast" recording function, you can record independent audio and video programmes, because the TV soundtrack is not lost, but recorded on the normal audio track. While recording a TV programme, record any audio source independently.
- Connect an audio component (such as an FM tuner) to the AUDIO EING. connectors.
- Set the AUFNAHMEWAHL switch to SIMUL.

Notes:
- If you stop recording to avoid unwanted material of the TV programme using the PAUSE/STANDB. button, the audio programme from an external source is also cut.
- If television broadcasting comes to an end during recording, the hi-fi sound being recorded from an external source may distort. It is recommended that you check the timetable of TV broadcasts in advance.
- After finishing recording, be sure to set the AUFNAHMEWAHL switch to TV; otherwise recording on the hi-fi audio track from the built-in tuner will not be possible.

USING THE HR-D470EG AS AN AUDIO DECK

You can record audio only (without recording any video signal) in either the SP or LP mode. In the LP mode you can enjoy up to 8 hours of hi-fi stereo recordings with a single cassette (E-240).

Recording from the AUDIO EING. connectors

- Connect an audio source (such as an FM tuner) to the AUDIO EING. connectors.
- Set the AUFNAHMEWAHL switch to SIMUL.
- Select the LP mode with the AUFNAHMEZEIT button.

Notes:

- The input signal is recorded only on the hi-fi audio track.
- Tune the built-in tuner to a vacant channel, if the SP mode is selected.
- In the LP mode, no video signal is recorded. However, the audio signal from the built-in tuner is recorded on the normal audio track; to avoid this, tune the built-in tuner to a vacant channel in this case as well.
- When playing back audio-only tapes that were recorded in the simulcast mode, with the tuner set to a vacant channel, Music Scan is not available, even if the SUCHL. MARKE button was used during recording. This is because nothing is recorded on the normal audio track.

Input to AUDIO EING.

↓

AUFNAHMEWAHL: SIMUL

↓

Hi-Fi LP

Recording from the AUDIO/VIDEO socket

- Connect an audio source (such as a Hi-Fi VHS deck) to the AUDIO/VIDEO socket.
- Press the "0" key of the 10-digit keypad.
- Select the LP mode with the AUFNAHMEZEIT button.

Note:

- In the LP mode, no video signal is recorded. The input audio signal is recorded on both the normal and hi-fi audio tracks. Therefore, the Record Mute function (see page 55) can be used for Music Scan in playback.

Input to AUDIO/VIDEO

↓

AUX (0)

↓

Hi-Fi LP

Playback of audio-only recordings

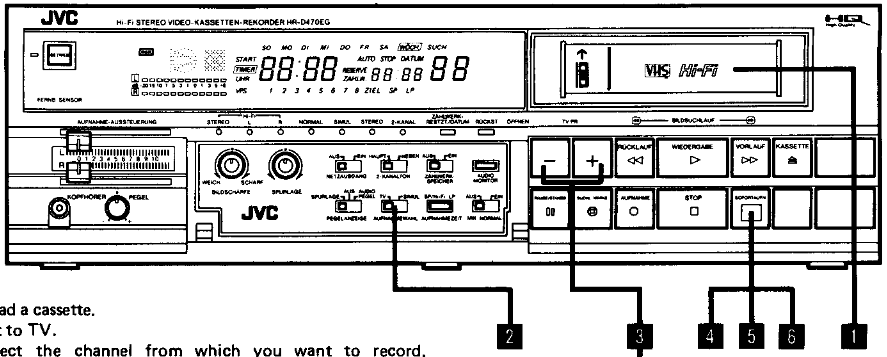
- When the cassette is inserted, the SP or LP mode recording is automatically detected and played back at a correct speed respectively with "SP" or "LP" lit on the FDP.
- Select the soundtrack (Hi-Fi STEREO, L or R) as required with the AUDIO MONITOR button.

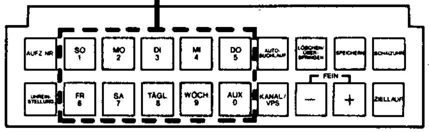
Note:

- After recording or playback in the LP mode, be sure to reset the mode to SP by pressing the AUFNAHMEZEIT button. When you play a regular video tape or SP mode audio-only tape, the mode will be automatically restored to SP.

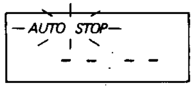
INSTANT RECORDING

Besides starting and stopping a recording as usual, the HR-D470EG offers a more convenient possibility: starting by the push of a single button, and recording will stop automatically after a certain period of time. Use this facility for starting a recording before you go to bed or leave home.

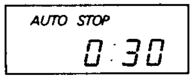

JVC
Hi-Fi STEREO VIDEO-KASSETTEN-REKORDER HR-D470EG
FERNB SENSOR
SO MO DI MI DO FR SA WOCH SUCH
START
TIMER
UHR
VPS
AUTO STOP DATUM
RESERVE ZAHLW.
ZIEL SP LP
VHS Hi-Fi
AUFNAHME-AUSSTEUERUNG
STEREO
NORMAL
SIMUL
2-KANAL
ZÄHLWERK-RESTZT/DATUM
RÜCKST
ÖFFNEN
TV PR
BILDSUCHLAUF
RÜCKLAUF
WIEDERGABE
VORLAUF
KASSETTE
STOP
SOFORTAUFN.
AUFNAHME
WEICH
SCHARF
BILDSCHÄRFE
SPURLAGE
NETZAUSGANG
2-KANALTON
ZÄHLWERK-SPEICHER
AUDIO MONITOR
KOPFHÖRER
PEGEL
PEGELANZEIGE
AUFNAHMEWAHL
AUFNAHMEZEIT
2
3
4
5
6
1


AUFZ NR
SO 1
MO 2
DI 3
MI 4
DO 5
AUTO-SUCHLAUF
LÖSCHEN ÜBER-SPRINGEN
SPEICHERN
SCHALTUHR
UHREIN-STELLUNG
FR 6
SA 7
TÄGL 8
WOCH 9
AUX 0
KANAL/VPS
FEIN
–
+
ZIELLAUF

1. Load a cassette.
2. Set to TV.
3. Select the channel from which you want to record. (Numeric keys can also be used.)
4. Press SOFORTAUFN.
   - The following indication will appear on the display, to show that the recorder is ready to start recording.
   - The AUTO STOP indicator on the display will flash.



5. Press SOFORTAUFN. once again.
   - Recording will begin immediately and the following indication will appear on the display, showing that recording will automatically stop and power will switch off after 30 minutes.
   - The AUTO STOP indicator remains lit.


AUTO STOP
0:30

6. Each time the SOFORTAUFN. button is pressed, recording time increases by 30 minutes up to 4 hours.
   - For a more precise time setting, use the numeric keys after recording has started. For this purpose, after "0:30" has appeared, specify the time using the numeric keys and press the SOFORTAUFN. button immediately. (Always key in a full number including hours and minutes. For "0:35", key in zero first.)

Notes:

- If the SOFORTAUFN. button is not pressed a second time within about 10 seconds after it has been pressed once, the Instant Record mode will be cancelled and the display will change back to the Counter mode.
- If you want to change the time setting again after the SOFORTAUFN. button has been pressed for memorisation of new data, simply press SOFORTAUFN. and redo the programming.
- While recording is in progress, the displayed time counts down; when 0:00 is reached, the Record mode is released after 10 seconds and the power is switched off.
- If you want to stop recording after having started recording in the Instant Record mode, press the STOP button.
- The instant recording function can also be used as a sleep timer. If you press the SOFORTAUFN. button during normal recording, the AUTO STOP indicator will light on the display and the indication "0:30" will be obtained, showing that recording will stop automatically after 30 minutes. The time span can be adjusted in the same way as for instant recording.
- Instant recording has priority over all other modes including VPS recording. If a preset VPS programme starts during instant recording, recording of that VPS programme will begin only after the Instant Record mode has ended.
- If the SOFORTAUFN. button is pressed with a non-recordable cassette loaded (one with its safety tab removed), the cassette will be automatically ejected.
- If you want to perform instant recording after you have set the timer with the SCHALTUHR button engaged and the TIMER indicator lit, press the SOFORTAUFN. button as usual. Power will be turned on and instant recording will start. After instant recording has been performed, the Timer mode is automatically re-entered and power is turned off.
- If the programmed switch-on time for a timer recording should come after the switch-off time of the instant recording, this timer recording will still be made automatically.

AUTOMATIC VPS OR TIMER RECORDING

Basic Procedure

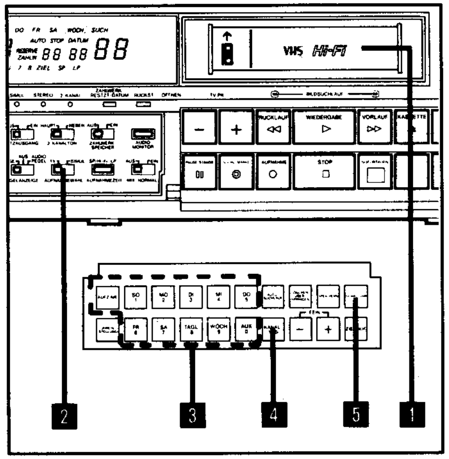
1 Load a cassette (with safety tab in place).

2 Make sure the AUFNAHMEWAHL switch is set as required (TV or SIMUL).

3 Programme the timer memory.

4 Engage VPS, if required.

5 Press SCHALTUHR to engage the Timer Recording Standby mode.



Use either the recorder's controls or the remote control's keys.

VPS recording

VPS stands for the Video Programme System which adds flexibility to timer recording with a video cassette recorder. In this system, TV stations transmit special VPS codes using a multiplex system while certain programmes are being broadcast; the codes are different for different programmes. These VPS codes control the starting and stopping of the video recorder and have precedence over times preset in the timer. Using the VPS function, if a programme starts earlier or later than scheduled or overruns its scheduled time, it will be recorded from start to finish. The HR-D470EG incorporates a VPS decoder which detects the VPS codes and controls power on/off and tape start/stop. First programme the timer, then, if you switch on the VPS function, all timer data – day, start time, stop time and channel – are converted to VPS codes and stored in memory. When the VPS function is not engaged, the timer starts and stops recording in the usual way.
If the VPS function is engaged, the HR-D470EG will enter the VPS standby mode at 20:00 on the day previous to the preset day and remain engaged until 4:00 on the following day, if the intended programme has not been broadcast. This means that if the required programme starts within *this 32-hour period it will be recorded correctly.*

One-year calendar timer

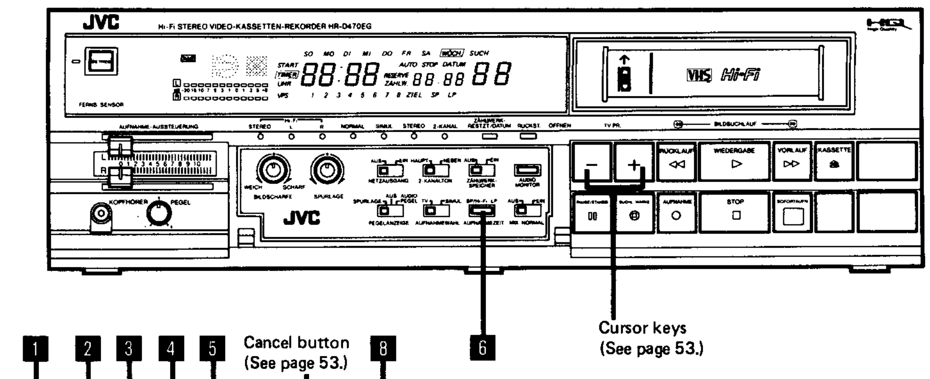
"One-year" presetting capacity means that you can "reserve" a recording on any day, even one year in advance. One extreme case: If the date entry corresponds to the current day and the START time is set to a time before the current time, recording will start on the same day next year.

8-Programme timer

"8-Programme" presetting capacity means that you have 8 separate timers which contain different programming data. Because of this capacity, you can even "reserve" 8 different TV programmes, either on the same day or on different days.
Each programme (No. 1 through No. 8) contains information on "date" (or "daily"), "start time", "stop time", "TV channel number", "SP or LP" and "VPS or regular".

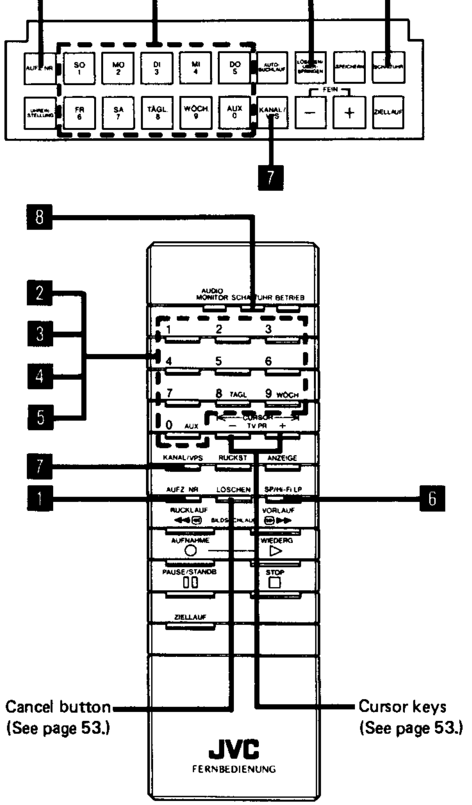
Example of the contents of one programme entry:

Programme number	TV channel number	Date	Start time	Stop time	Recording mode	VPS
2	12	05.12	10:30	11:30	SP	VPS



Cancel button (See page 53.)

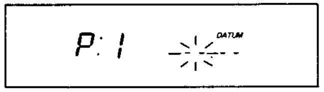
Cursor keys (See page 53.)



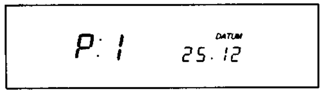
Cancel button (See page 53.)

Cursor keys (See page 53.)

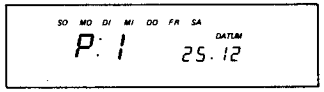
1 Press AUFZ. NR.
The display will change to the Timer Set mode with P 1 illuminating and the date display section flashing. You are ready to enter the data into No. 1 programme memory. To advance to programme numbers 2 – 8, press again. After programme 8, the Clock mode will be engaged.



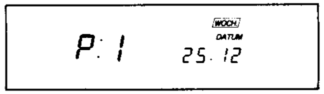
2 Enter the date using numeric keys.



- Invalid numbers will be rejected.
- To record a daily serial starting on the day of setting, move the cursor with the "+" button to the START time setting without entering any date figure.
- To record a daily serial starting on a certain day, press [8] (TÄG L.) and enter the date.

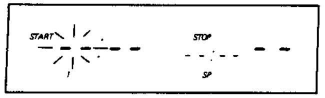


- The "daily" entry can be cancelled by pressing [8] again.
- To record a weekly serial, press [9] (WÖCH.) and enter the date.

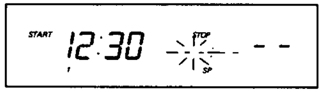


- The "weekly" entry can be cancelled by pressing [9] again.
- Both "daily" and "weekly" information can be entered or cancelled also in the time setting stage.
- When both day and month data have been entered, the display will change to the time setting mode and the programme number will be displayed at the bottom of the FDP panel.

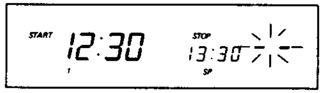
3 Key in the start time.



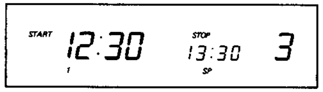
- To key in a one-digit number of hours or minutes, first press [0]. Then press the relevant numeric key.
- The minute digits will start flashing after keying in the hour.
- The hour digits of the "STOP" time will start flashing after keying in the start time.



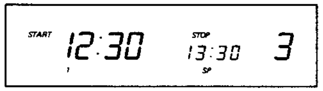
4 Key in the stop time in the same manner as the start time.
- The digits of the channel display will start flashing after keying in the stop time.



5 Enter the channel.
- Invalid numbers will be rejected.
- For a two-digit number, enter the second digit while the digit entered first is blinking. (See page 41.)

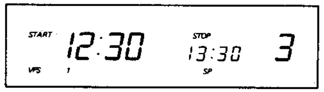


6 Select the recording speed by pressing AUFNAHMEZEIT (SP/Hi-Fi LP on the remote control).



- The SP or LP entry can be made anytime while in the Timer Set mode.

7 For VPS recording, press KANAL/VPS button.
- VPS can be entered or cancelled anytime while in the Timer Set mode by pressing KANAL/VPS.



8 Press SCHALTUHR button.
- The TIMER indicator will light. (For error indications, see page 54.)
- The display will return to the Clock mode, also showing the programme numbers for which recording data has been programmed.

How to use the cursor keys
- If you press a wrong key and the flashing position has advanced, press "–" to return to the previous position for correction.
- Once all data have been programmed, you can reach any position for correction using "–" or "+". The flashing position is ready for re-entry.
- The cursor (flashing position) advances or returns in the following order.

Date ⇄ Start time ⇄ Stop time ⇄ Channel

(Pressing AUFZ. NR. engages the check mode in which no position flashes and data correction is not possible. To correct the data, press either cursor key; "+" to move to "Date" or "–" to move to "Channel".)

Setting the DATUM, START and STOP times
- It is not possible to set the DATUM, START and STOP times unless the date and the clock time have previously been set.
- Enter the data while the digit positions are flashing.
- Unless the START time has been properly set, STOP time setting is not possible.
- The STOP time can be set within 24 hours from the START time. If the hour setting for the STOP time runs into the following day, there is no need to set the day. Recording will stop at the preset time on the following day.
- Non-applicable numbers (such as January 32, February 30 for dates, 24 or larger for hours, 60 or larger for minutes and 33 or larger for channels) will be rejected when keyed in.
- In leap years, be sure to readjust the date in the Clock mode, otherwise timer recording will not be performed correctly.

Last-channel memory
- The currently tuned channel locks in the Timer Set mode and, when the display returns to the Clock mode, the locked channel is displayed.

Cancelling the preset data
- The preset programmes can be cancelled by pressing the LÖSCHEN/ÜBERSPRINGEN button. For this purpose, first engaege the Timer Set mode for the number you wish to cancel and then press the LÖSCHEN/ÜBERSPRINGEN button.
- Unless the VPS mode is engaged, an executed programme is automatically cleared.

Checking the programmed data
- Checking and re-programming can be performed anytime, even when the SCHALTUHR button has already been engaged.
- While recording is actually taking place in the regular Timer mode, the STOP time can be changed. For this purpose, engage the Timer Set mode and move the cursor; only "STOP" time will flash. This means you can re-programme the stop time.
- While recording is actually taking place according to one preset programme, all other preset programmes can be checked or re-programmed.
- To disengage the Timer Set mode, press the ZÄHLWERK/RESTZT./DATUM button (on the recorder) or the ANZEIGE button (on the remote control).

Additional information for timer setting and operation

TIMER indicator (Error indication)
- When the SCHALTUHR button is pressed with a cassette loaded and the timer correctly programmed, the TIMER indicator on the display will light with the corresponding programme number(s) also lighting and the power is turned off.
- When you have preset several programmes at a time, confirm that all the preset programme numbers light together with the TIMER indicator when the SCHALTUHR button is pressed. The programme whose number does not light has not been correctly preset. Recheck the programmed data.
- Programming errors include cases where either "START" or "STOP" time has not been preset, or both these preset times are the same. A "no-channel-programmed" situation is not interpreted as an error, and recording will be made of the currently tuned channel.
- If all programmes have been wrongly preset, the TIMER indicator will flash for about 10 seconds when the SCHALTUHR button is pressed, and remain lit with no programme number lit.
- If the SCHALTUHR button is pressed when a cassette is not loaded, the TIMER indicator will continue blinking.
- If a cassette with its safety tab removed has been loaded, it will be ejected automatically when the SCHALTUHR button is pressed. The TIMER indicator will continue blinking.
- As long as the SCHALTUHR button is engaged, unloading of a cassette is not possible.

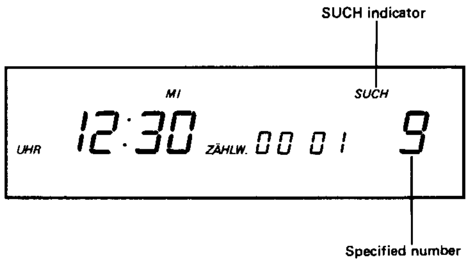
VPS operation
- When a VPS code corresponding to the intended TV programme is detected, recording will start with "VPS" blinking. When the VPS code changes to another, recording will stop.
- If no VPS code is detected during the VPS standby mode (for example, the tuned-in station does not transmit VPS codes), ordinary timer recording will be engaged; recording will start at the preset time and stop at the preset time.
- When an interruption code is detected during VPS recording, the recorder enters the VPS standby mode and restarts recording when the regular VPS code is restored.
- When the VPS code stops for some reason during VPS recording, recording will stop at the preset stop time.
- If a system status code which cancels VPS recording is detected during the VPS standby mode, ordinary timer recording will be engaged.
- During VPS recording, the number of the programme that is presently operating and the indication "VPS" will be blinking.
- After VPS recording, the power is switched off and the auto rewind mechanism does not function. If the end of the tape is reached during VPS recording, the cassette is automatically ejected and then the power is switched off.

Regular timer operation
- If the VPS mode is not engaged, tape loading starts 20 seconds before the preset START time and the recording start signal is triggered 2 seconds before the preset time so that recording starts exactly at the preset time.
- During timer recording, the number of the programme that is presently operating will be flashing.
- Operation at the end of recording is the same as with VPS operation.

Programme priority
- If several programmes have preset times which overlap, as a rule, VPS programmes have priority and, among VPS programmes, the smaller programme number has priority.

MUSIC SCAN AND RECORD MUTE FUNCTIONS

The Music Scan function automatically locates the beginning of a specified musical selection and starts playback automatically. With the HR-D470EG, up to 9 musical selections can be scanned in both forward and reverse directions.
For the Music Scan function to operate properly, there must be non-recorded sections (blanks) between musical pieces on the normal audio track, which can be made by the Recording Mute function during recording.



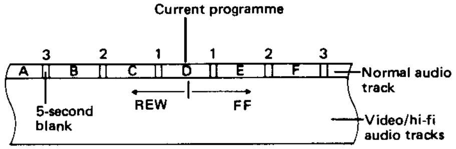
Music Scan

1. Specify the number of the desired musical selection during playback by pressing one of the numeric keys (1 – 9).
   - •The SUCH indicator and the specified number will appear on the FDP.
2. Press the VORLAUF or RÜCKLAUF button within 2 seconds, depending on the desired scanning direction.
   - •When the specified musical selection is reached, the SUCH indicator will turn off and playback will start automatically.
   - •If pictures are also recorded on the tape and the television is on, the search picture is visible on the screen.
   - •To cancel the Scan mode during scan, simply press the WIEDERGABE button; normal playback will resume.

Notes:

- The Music Scan function will not operate properly in the following cases:
  - – The score itself contains lengthy pianissimo or silent periods.
  - – Overall recording level of the tape is too low.
  - – Blanks between passages are too short (less than 5 seconds).
  - – Blanks contain noise or hum.
- If any blank is not detected during the first 10 minutes of scanning, the Scan mode is cancelled and playback resumes.
- If you want to correct the number during scan, simply re-enter a different number.
- If the end of the tape is reached during scan, the Scan mode is cancelled and the tape is automatically rewound.

Hints for specifying a musical selection



- •"1" + VORLAUF scans to the beginning of the next programme (E).
- •"1" + RÜCKLAUF scans to the beginning of the current programme (D).
- •"2" + RÜCKLAUF scans to the beginning of the previous programme (C).

Record Mute

When the SUCHL. MARKE button is pressed during recording, and the normal audio input signal is muted for about 5 seconds. Because the tape continues running during this period, a non-recorded section is produced on the normal audio track.
To take the best advantage of this facility, proceed as follows:

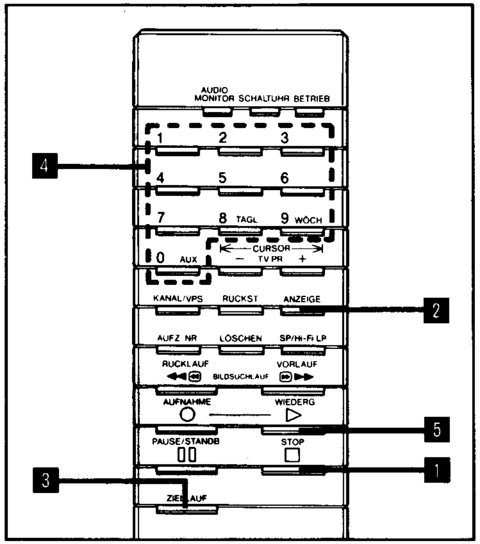
1. Press the SUCHL. MARKE button at the end of one programme.
2. Press the PAUSE/STANDB. button immediately after pressing the SUCHL. MARKE button.
   - •The tape will stop after a 5-second blank is produced.
   - •During this 5-second period, the Symbolic mode indicators for RECORD and PAUSE will be blinking.
3. Press the WIEDERGABE button to start recording of the next programme.

Notes:

- Because the same signal is recorded on the hi-fi and normal audio tracks simultaneously, the Music Scan function during playback is also effective in listening to the hi-fi soundtrack.
- The SUCHL. MARKE button does not function during instant recording or timer recording.

COUNTER GO-TO FUNCTION

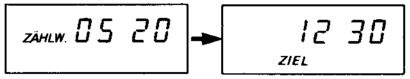
The counter go-to function gives you direct access to any point on the tape by simply specifying a desired counter reading. Depending on your command, the tape will either stop at that point or playback will start automatically from there.



1 Engage the Stop mode.

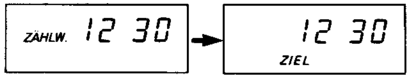
2 Call up the Counter mode with the ZÄHLWERK/RESTZT./DATUM button. (or the ANZEIGE button on the remote control)

3 Press the ZIELLAUF button.
- •The counter will change to the go-to mode.
  There are three possible cases:
  (1) Counter reading changes from one number to another.



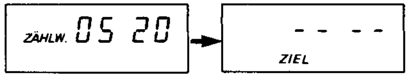
Relative count Absolute count

(2) Counter reading remains unchanged.



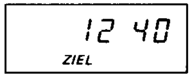
Absolute count Absolute count

(3) "----" appears instead of a number.



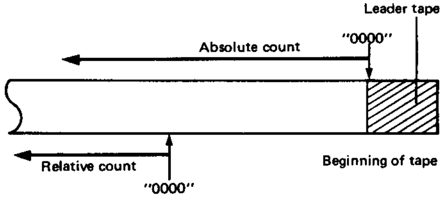
- •The recorder did not detect the leader tape when the cassette was loaded and, therefore, cannot determine the tape's present position in relation to its beginning.

4 Specify the point you want to locate by using 10 numeric keys.



5 Press the WIEDERGABE (or the WIEDERG. button on the remote control) button if you want playback to start there or the STOP button if you want the tape to stop there.
- •In cases (1) and (2), the tape will either fast forward or rewind to the specified point.
- •In the case of (3), the tape is first rewound to the beginning of the tape (where the counter is automatically reset to "0000") and then is fast forwarded to the specified point.
- •Once the beginning of the tape is detected in this way, the tape counter always reads the position in relation to the beginning until the RÜCKST. button is pressed at a different position.
- •If the specified number exceeds the tape length, the tape is first fast forwarded to its end, then rewound to its beginning and stops.
- •Use of the go-to function cancels the previous relative count.

Absolute count vs. Relative count



- •The absolute "0000" count is automatically set when the leader tape is detected at the time of cassette loading.
- •The relative "0000" count is set when the RÜCKST. button is pressed and does not apply to the counter Go-To procedure.

COUNTER MEMORY AND COUNTER/REMAIN FUNCTIONS

Counter Memory function

1. Press the ZÄHLWERK/RESTZT./DATUM button to obtain the Counter mode.
2. Press the RÜCKST. button at a point which you may wish to locate later.
   - The tape counter will indicate "0000".
3. Press the ZÄHLWERK-SPEICHER button to EIN (▬).
4. Press the RÜCKLAUF (or VORLAUF) button when you need to return to the designated point. The tape will rewind (or fast forward) and stop at about the "0000" counter reading automatically.

Memory Play function

If you want playback to start automatically at the counter reading of "0000", press the WIEDERGABE button within 2 seconds after pressing the RÜCKLAUF or VORLAUF button in step 4.

ZÄHLWERK/RESTZT./DATUM button

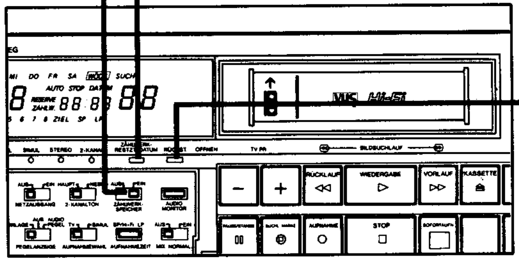
Press to change the display to tape counter (ZÄHLW.), remaining tape time (RESERVE) and date (DATUM). To use the display as the tape counter, call up the ZÄHLW. indicator. To check the length of tape left, call up the RESERVE indicator; the remaining tape length will be shown in hours and minutes. (It will take a brief period for the numerals to appear). This button can also be used to change the display from the Timer Set mode to the Clock mode.

RÜCKST. button

Press to reset the tape counter to "0000" for indexing the tape.

Note:

Unless the RÜCKST. button is pressed, the count is maintained even after the power is switched off (as long as the unit is plugged into an AC outlet).



Notes:

- During recording, the remaining tape length is calculated in reference to the recording mode selected by the SP/Hi-Fi LP button; during playback, it is calculated in reference to the recording mode of the tape being played (SP/LP).
- The indicated remaining time is approximate. The time required to calculate the remaining tape length and the accuracy of that calculation may vary according to the type of cassette tape. (The remaining time indication is not available if this mode is engaged from Fast Forward or Rewind.)

RECORDING WITH A VIDEO CAMERA

Connection

To connect a video camera, an appropriate camera adapter is necessary.

- Connect the video camera to the camera adapter.
- Connect the camera adapter to the HR-D470EG: adapter's AUDIO and VIDEO OUT to recorder's AUDIO/VIDEO, and adapter's PAUSE to recorder's PAUSE FERNBEDIENUNG.

For proper connection of a camera to the HR-D470EG, consult a JVC dealer.

Operation

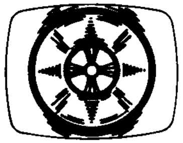
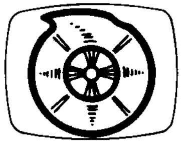
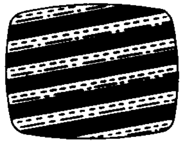
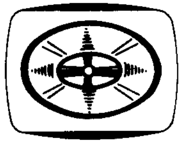
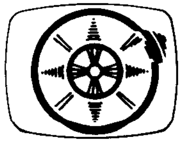
1. Turn the power on for all connected equipment.
2. Adjust the TV receiver to your video channel.
3. Load a cassette.
4. Press the "0" key of the 10-digit keypad to engage the AUX mode.
5. Press the AUFNAHME and PAUSE/STANDB. simultaneously.
   - The recorder enters the Recording Standby mode.
6. Operate the camera's start/stop switch.
   - Recording starts and stops with this switch.
7. To end of the recording, press the STOP button.

Notes:

- If feedback noise (whistling or howling) is heard from the TV receiver, reduce the volume or move the camera's microphone, farther away from the TV receiver.
- For camera operation refer to the instruction manual for the relevant camera.

ADJUST YOUR TV RECEIVER WHEN . . . . .

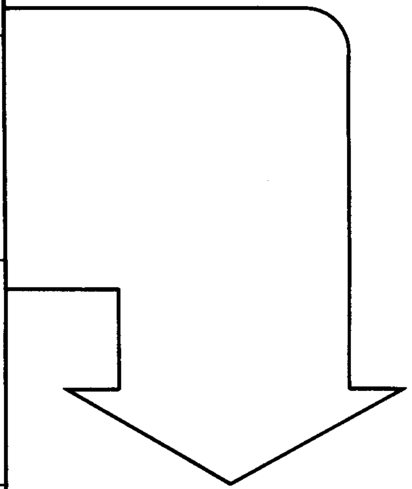
Still Playback may require adjusting your TV receiver. If your TV receiver shows the following symptoms during Still Playback, adjust the TV receiver first.

Symptom	Adjustment
Picture vibrates vertically. 	Turn the V-Hold knob slightly for stabilising.*
The upper portion of the picture drifts horizontally. 	Turn the H-Hold knob slightly for stabilising.**
Picture rolls. 	Turn the H-Hold knob slightly for stabilising.**
Picture is flattened vertically. 	Inherent in your TV receiver.
Only a portion of the picture continues to flicker. 	Not adjustable. Inherent in your TV receiver.

HEAD CLEANING

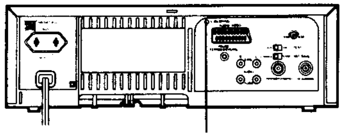
- Picture playback may become blurred or interrupted while the TV programme received is clear. This does not mean that the recorded programme has been erased.
- Dirt accumulated on the video heads after long periods of use causes such troubles. In this case, head cleaning requiring highly technical care is necessary.

*For head cleaning, consult the nearest JVC dealer.



If the V-Hold and H-Hold knobs are not provided on your TV receiver, please consult your JVC dealer.

Rear


V-BILDFANG control

* If an unsatisfactory result is obtained, adjust the V-BILDFANG control located on the rear panel of the HR-D470EG so that a stable picture is obtained.

** If an unsatisfactory result is obtained, it is necessary to adjust the AFC circuit of the TV receiver.

IN CASE OF DIFFICULTY

What may initially appear to be trouble is not always a real problem. Make sure first . . . .

POWER AND TAPE TRANSPORT PROBLEMS

Symptoms	Check points
No power is applied to the recorder.	● Is the power cord disconnected? – Connect it.
Clock is functioning properly, but the recorder cannot be powered.	● Is the TIMER indicator lit on the FDP? – Press SCHALTUHR to disengage the Timer Recording Standby mode.
Tape does not run during recording.	● Is the PAUSE/STANDB. button engaged? – Press the WIEDERGABE button.
Tape stops in the Rewind or Fast Forward mode.	● Is the ZÄHLWERK-SPEICHER button set to EIN? – Set it to AUS.
Tape will not rewind or fast forward.	● Is the tape already fully rewound or fast forwarded? – Check the cassette.

RECORDING PROBLEMS

Symptoms	Check points
Recording cannot be started.	● Is a cassette loaded? ● Is the safety tab on the cassette removed? – Reseal the slot with cellophane tape.
Camera recording is not possible.	● Are the camera and the camera adapter correctly connected? ● Is the power switch of the camera adapter set to ON? ● Does the channel display indicate "0"? – Press AUX 0 .
Simulcast recording is not possible.	● Is the AUFNAHMEWAHL switch set to TV? – Set it to SIMUL. ● Is an audio source correctly connected to the AUDIO EING. connectors? – Check connections.
Timer recording is not possible.	● Have you set the clock correctly and programmed the timer correctly? – Check once again. ● Is the TIMER indicator lit on the FDP? – Press SCHALTUHR.

PLAYBACK PROBLEMS

Symptoms	Check points
Playback picture does not appear while the tape is running.	● Is the TV receiver's channel selector set to the correct video channel? – Set it to the RF converter channel. (See page 38.)
Noise appears during playback.	● Adjust the SPURLAGE control.
Playback picture is blurred or interrupted while TV broadcasts are clear.	● Video heads may be dirty. – Head cleaning is necessary. Consult your nearest JVC dealer.

HI-FI AUDIO PROBLEMS

Symptoms	Check points
TV sound cannot be recorded on hi-fi audio track.	● Is the AUFNAHMEWAHL switch set to SIMUL? – Set it to TV.
Breaks are noticeable in hi-fi audio reproduction.	● Adjust with the SPURLAGE control. (See page 43.) ● Have you adjusted the recording level correctly? – Over-level recordings could be a cause. Adjust the level correctly next time. See page 43.
Soundtrack on the hi-fi audio track cannot be reproduced.	● Does the NORMAL indicator light? – Press the AUDIO MONITOR button to Hi-Fi STEREO (or L or R as required).
Audio level indicators do not function.	● Is the PEGELANZEIGE switch set to a position other than AUDIO PEGEL? – Set it to AUDIO PEGEL.

OTHERS

Symptoms	Check points
Whistling or howling is heard from TV.	● Move camera or microphone away from TV or reduce TV sound volume.
Some channels are skipped over when selecting a channel.	● Those channels are preset to be skipped over. If you need them, restore them. (See page 40.)
Channel cannot be switched.	● Is recording in progress? – Press the PAUSE/STANDB., select a desired channel and press the WIEDERGABE.

This recorder contains microcomputers. External electronic noise or interference could cause malfunctioning. In such cases, switch the power off and unplug the power cord. Then plug it in again and switch on. Take out the cassette. After checking the cassette, operate the unit as usual.

INSTRUCTIONS:
VIDEO CASSETTE RECORDER

For refernce, the text of the Instruction booklet for this model is reproduced in the following pages.

Numbering of the pages also corresponds with that of the booklet.

The Instructions shown pertain specifically to the Model HR-D470EG. For detailed descriptions, be sure to consult the Instruction booklets of the other models.

Main differing points with respect to other models in this series (with suffixes E and EG) are aslo included.

The following table lists the principal differing points among the models (suffixes E, EG and EK) in this series.

Model **Item**		**EG**	**E**	**EK**
Power reguirement		220 V∿, 50/60 Hz	←	240 V∿, 50/60 Hz
Power consumption		37 W	←	32 W
Aerial input	VHF channels	47 – 89 MHz, 104 – 300 MHz, 302 – 470 MHz	←	No
	UHF channels IV/V	470 – 862 MHz	←	CH 21 – 69
AUDIO	AUDIO/VIDEO socket	21-Pin Peri connector	←	No
VPS decoder		Yes	←	No
Sound multiplex capability		Yes	←	No

NOTE: ← Same as model at left.

SECTION 1
MECHANISM ADJUSTMENT

1.1 GENERAL

1.1.1 Precautions

IMPORTANT:

1. Disconnect unit from power before removing or soldering components.
2. When removing a fastener (screw, washer, etc.), be careful not to drop it into the mechanism. If a fastener should be dropped, be sure to retrieve it.
3. The tape transport mechanism has been precisely adjusted at the factory and ordinarily does not require readjustment.
4. When removing a part, be very careful not to damage or displace other parts. (Be especially careful with the tape guides and rotary video head drum.)
5. For service procedures that call for operation of the set with the cassette housing is separated from the main-deck, perform as below.

1) Disable the photo transistor sensor (END SENSOR) on the main-deck by applying an opaque cover.
2) Supply power and select required mades with front panel operation buttons.

1.1.2 Required test equipment, fixtures and tools

For proper mechanical adjustment, the following test equipment, fixtures and tools are strongly recommended. Without them, a long trial-and-error period would be necessary, resulting in possible damage. In addition, general-purpose tools are required.

1. Test equipment required:

Color television or monitor
Oscilloscope: Wide-band, dual trace, triggered, delayed sweep
Recording tape
Alignment tapes

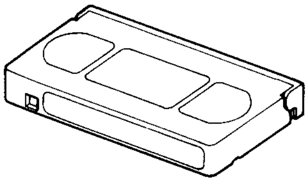
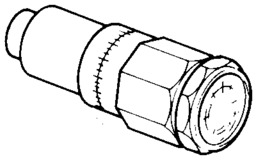
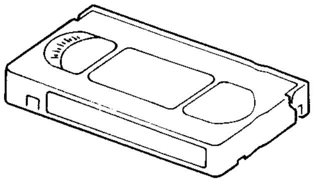
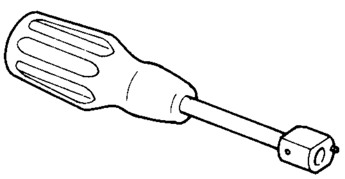
JVC alignment tape MH-2/MH-F2 	Torque gauge assembly PUJ48075-2 (Torquemeter : 600ATG Torquemeterhead : PUJ48016-2) 	Back tension cassette gauge PUJ48076 
A/CTL head position tool PUJ47351-2 		

Table 1-1-1 Fixtures and tools

1.1.3 Layout of main parts

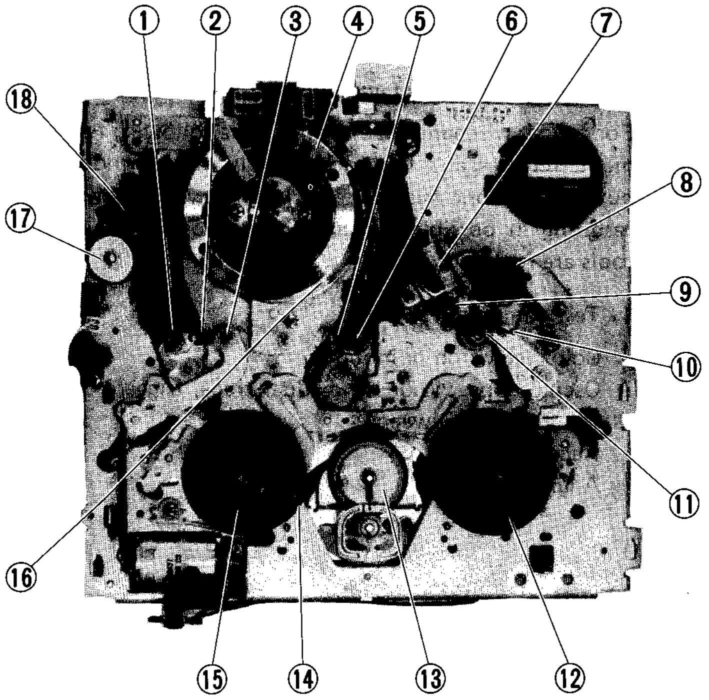


Fig. 1-1-1 Top view of main-deck

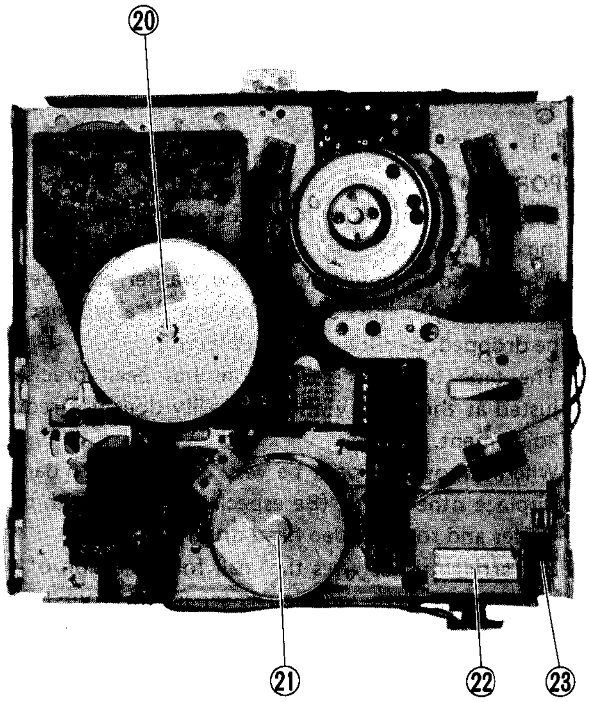


Fig. 1-1-2 Bottom view of main-deck

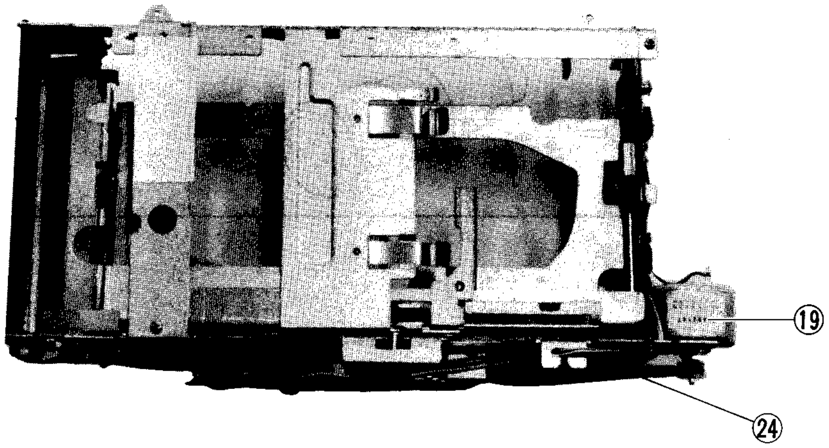


Fig. 1-1-3 Cassette housing

1.	Supply guide roller	9.	Take-up guide pole	17.	Impedance roller
2.	Supply slant pole	10.	Guide arm	18.	Full erase head
3.	Tension pole	11.	Capstan	19.	Cassette motor
4.	Upper drum	12.	Take-up reel disk	20.	Capstan motor
5.	Take-up slant pole	13.	Reel idler	21.	Reel motor
6.	Take-up guide roller	14.	Tension band	22.	Mode motor
7.	A/C head	15.	Supply reel disk	23.	Mode belt
8.	Pinch roller	16.	Lower drum	24.	Cassette belt

1.2 MAIN ASSEMBLY REPLACEMENT

1.2.1 Upper drum assembly

Notes: When handling and installing the upper drum assembly, avoid directly touching the head tips on the upper drum assembly.

For cleaning the head tips, push and hold a lint-free cloth or chamois dampened with alcohol to the upper drum assembly by the fingers, then turn the upper drum assembly clockwise. Do not clean the upper drum assembly with a vertical stroke.

1. Removal
1) Take out a screw and remove the brush assembly from the drum assembly.
2) Unsolder all soldered portions on the DRUM PWB. Remove excess solder, then remove the DRUM PWB from the upper drum assembly.
   Note: Soldered portion can be easily removed by removing solder with sucker or wick.
3) Take out two screws and remove the upper drum assembly upwards.

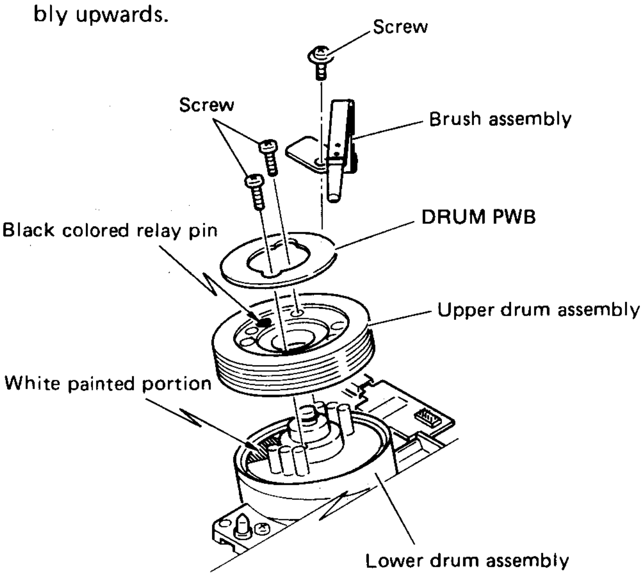


Fig. 1-2-1 Upper drum assembly

2. Installation
1) Install a new upper drum assembly so that the black-colored relay pin of the upper drum assembly overlies the white painted portion of the lower drum assembly, as shown in Fig. 1-2-1.
2) Tighten two screws in a balanced manner.
3) Set the DRUM PWB on the upper drum assembly, then resolder it.
4) Clean the drum unit (particularly clean the upper drum assembly).
5) Mount the brush assembly on the original position, then tighten a screw to fix the brush assembly.

3. Confirmation and adjustment
1) Perform the FM envelope confirmation. Refer to section 1.6.1.
2) Perform the PB switching point adjustment of the Servo circuit. Refer to section 2.4.1.
3) Perform overall confirmation of the FM audio circuit. Refer to section 2.7.

1.2.2 A/C head (Audio/control head)

1. Removal
1) Disconnect connectors from the A/C HEAD PWB.
2) Take out two screws, then remove the A/C head and the head base together.
3) Unsolder and separate the A/C HEAD PWB from the A/C head.
4) Take out a screw and remove the shield cap from the A/C head.
5) Take out three screws and separate the A/C head from the head base. Use care regarding springs. Do not lose them.

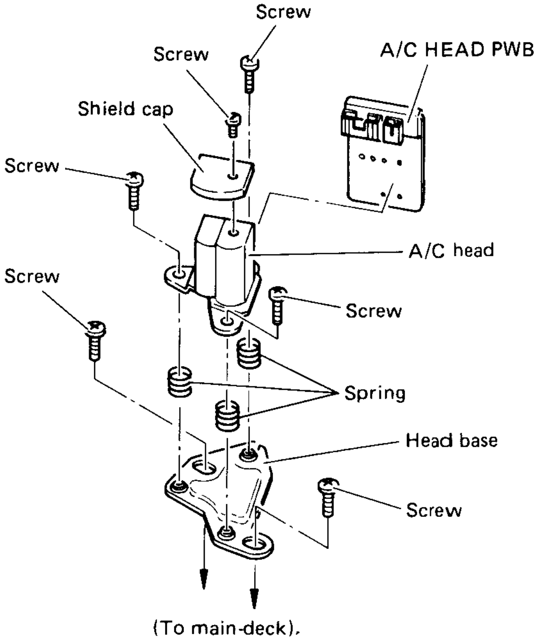


Fig. 1-2-2 A/C head

2. Installation
1) Mount a new A/C head and other peripheral parts on the main-deck by reversing the removal procedure.
2) Before installing the A/C head on the main-deck, perform rough-adjustment of A/C head height as shown in Fig. 1-2-3.

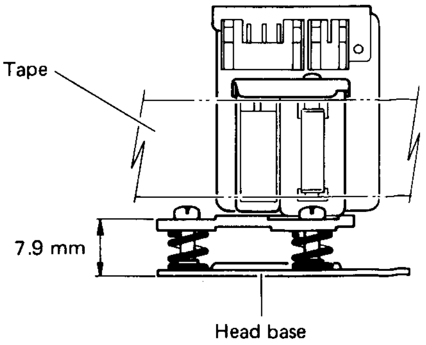


Fig. 1-2-3 A/C head height

3. Confirmation and adjustment
1) Use a recording tape and confirm correct tape transport operation, then perform interchangeability adjustment. Refer to sections 1.5 and 1.6.
2) Perform overall confirmation of the Audio circuit. Refer to section 2.6.

1.2.3 Tension band assembly

1. Removal
1) Take out a screw, then pry the A portion of the tension band assembly upwards to separate it from the tension arm assembly.

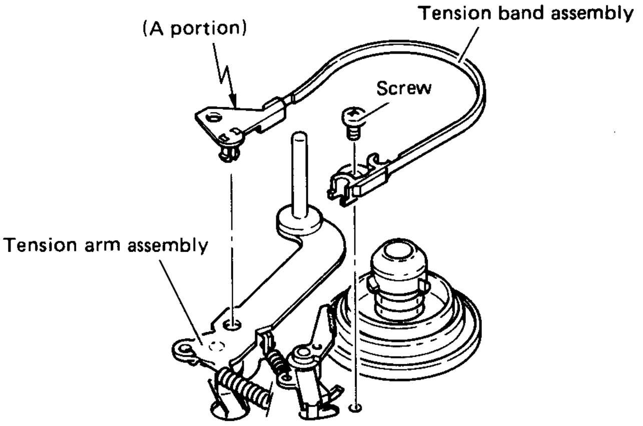

(A portion)
Tension band assembly
Screw
Tension arm assembly

Fig. 1-2-4 Tension band assembly

2. Installation
1) Install a new tension band assembly by reversing the removal procedure.

3. Confirmation and adjustment
1) Perform tension pole position adjustment. Refer to section 1.4.1.

1.3 ASSEMBLY PROCEDURE OF MECHANISM

The mechanism of this model is mostly engaged to the mechanism control circuit, through the mode select switch. Therefore, the relation between the mode select switch and the control arm decides all mechanical movement of the mechanical parts such as levers, gears, rollers and so on. If these parts are not properly positioned, the unit will be unloaded or compulsorily stopped. This will result in damage of mechanical or electrical parts.

1.3.1 Loading arm assembly

Loading arm assembly consists of loading gear, torsion spring and loading arm.

1. Set up the loading arm assembly correctly as shown in Fig. 1-3-1.

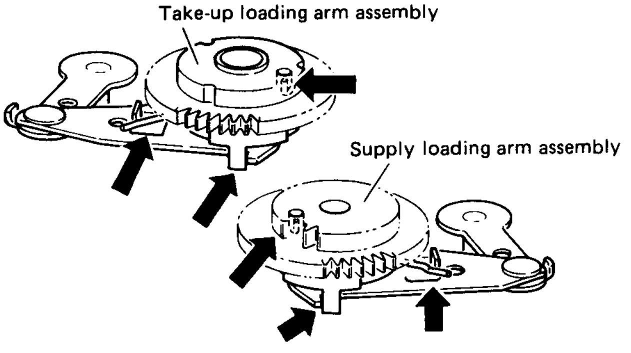

Take-up loading arm assembly
Supply loading arm assembly

Fig. 1-3-1 Loading arm assembly (1)

2. Install the take-up loading arm assembly and the supply loading arm assembly so that the holes on the loading gears face each other, as shown in Fig. 1-3-2. Do not move the loading arm assemblies from this position for the next step.

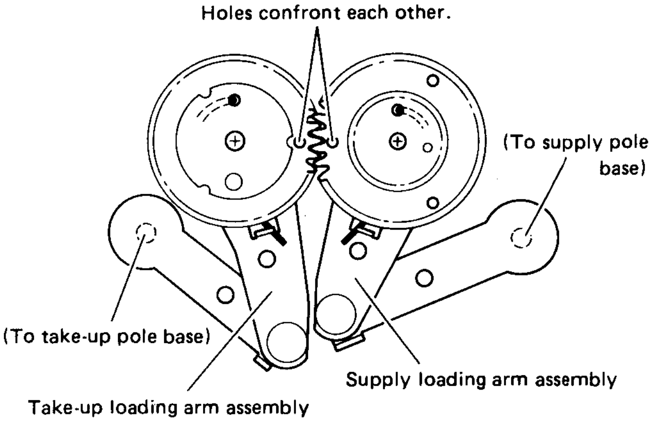

Holes confront each other.
(To supply pole base)
(To take-up pole base)
Supply loading arm assembly
Take-up loading arm assembly

Fig. 1-3-2 Loading arm assembly (2)

1.3.2 Control cam

1. Set the arm gear assembly on the cam bracket assembly so that the hole of the arm gear assembly overlaps the hole of the cam bracket assembly.

2. Install the control cam on the cam bracket assembly so that the hole of the control cam overlaps the hole which is indicated in the step 1), as shown in Fig. 1-3-3. Do not turn the control cam from this position for the next step.

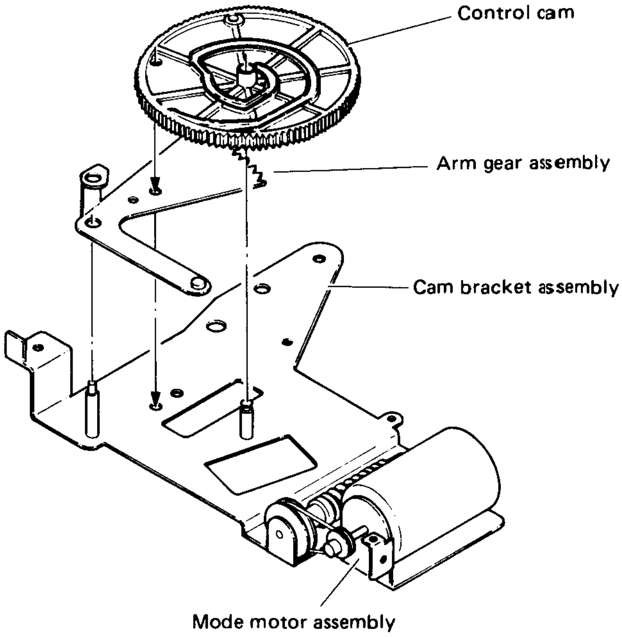
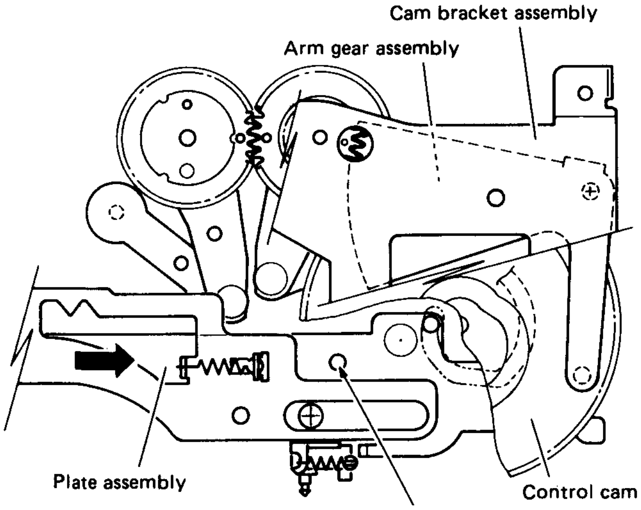

Control cam
Arm gear assembly
Cam bracket assembly
Mode motor assembly

Fig. 1-3-3 Control cam

1.3.3 Cam bracket assembly

1. Push and hold the plate assembly so that the hole of the plate assembly overlaps the hole of the main-deck, as shown in Fig. 1-3-4.
2. Then mount the cam bracket assembly.



Cam bracket assembly
Arm gear assembly
Plate assembly
Control cam

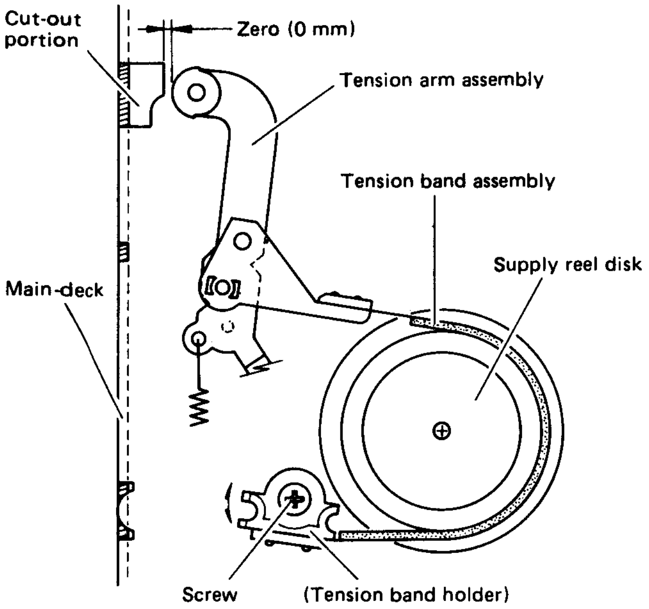
This hole overlaps the hole of main-deck.

Fig. 1-3-4 Cam bracket assembly

1.4 CONFIRMATION AND ADJUSTMENT

1.4.1 Tension pole position adjustment

1. Without loading a tape, set for the Play mode.
2. Loosen screw a little bit, then adjust the tension band holder so that the distance, shown in Fig. 1-4-1, becomes zero (0 mm).
3. Tighten screw to fix the tension band holder.



Cut-out portion
Zero (0 mm)
Tension arm assembly
Tension band assembly
Supply reel disk
Main-deck
Screw
(Tension band holder)

Fig. 1-4-1 Tension pole position

Note: By this adjustment, back tension is within normal specification, in spite of parts tolerances.

4. Use the back tension cassette gauge and set for the Play mode.
5. Confirm that the indication is between 26—46.

1.4.2 Take-up torque confirmation

1. Set the Play mode without the cassette housing assembly.
2. Set the torque gauge on the take-up reel disk.
3. The torque gauge consists of upper and lower sections connected by a spring mechanism. Relax the grip on the torque gauge so that the indicator needle and scale rotate at equal speed, then read the indication. The correct value is between 45—155.
4. If necessary, replace the take-up and supply clutches.

1.5 TAPE TRANSPORT SYSTEM CONFIRMATION AND ADJUSTMENT

Once adjusted to the complete condition, readjustment of the tape transport system is not necessary, except when the parts that compose the tape transport system are replaced due to troubles by long usage or unexpected accidents.

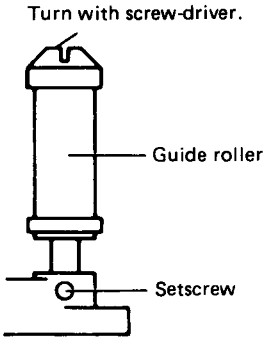
1.5.1 Tape transport system adjustment

1. Guide roller

   To get the FM envelope into ideal shape for interchangeability, the height adjustment of the guide roller is needed.

   Before turning the guide roller, slightly loosen the setscrew located under the guide roller. For loosening the setscrew, use the hex key (1.25 mm).

   Note: Loosen the setscrew enough to allow the guide roller to be turned. If excessively loose, tape motion may turn the guide roller inadvertently.



Turn with screw-driver.
Guide roller
Setscrew

Fig. 1-5-1 Guide roller

2. Impedance roller
   Normally, do not adjust the height of the impedance roller. Only when the defects of tape travel are noted at the impedance roller, after complete adjustment for interchangeability, adjust the height of impedance roller to obtain smooth tape travel. For adjustment of impedance roller height, use the nut-driver (5.5 mm).

   Note: Do not lower the impedance roller excessively to avoid the defects of tape travel. Tape must be along the lower flange located under the impedance roller.

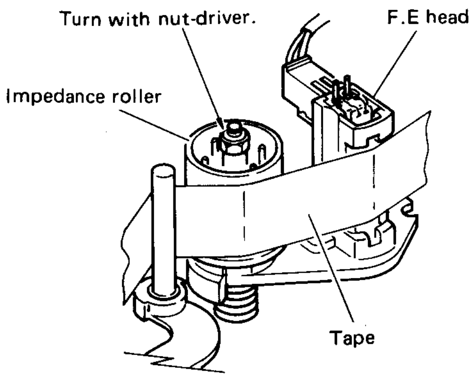

Turn with nut-driver.
F.E head
Impedance roller
Tape

Fig. 1-5-2 Impedance roller

3. A/C head (audio/control head)
   When defects of tape travel are noted at the take-up guide pole, adjust the inclination of A/C head to obtain smooth tape travel.

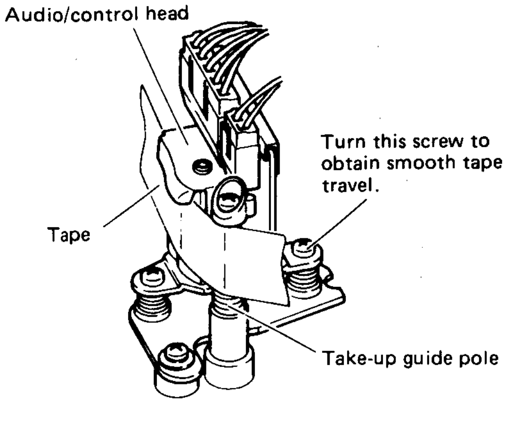

Audio/control head
Turn this screw to obtain smooth tape travel.
Tape
Take-up guide pole

Fig. 1-5-3 A/C head

1.6 INTERCHANGEABILITY CHECKS AND ADJUSTMENT

Before using costly Alignment tape, use a spare cassette and confirm proper tape transport without damage to the tape.

1.6.1 FM waveform

The FM waveform checks and adjustments are performed using the stairstep signal of the MH-2 Alignment tape. Connect an oscilloscope to the FM output test point of the video play-back circuit and trigger the oscilloscope externally with the signal from the flipflop (FF) test point of the video circuit.

1. Play the MH-2 Alignment tape and adjust the tracking for maximum FM output. With the maximum taken as (a), the minimum center output as (b), the minimum at the drum input as (c) and the minimum at the drum output as (d), confirm the following relationship.

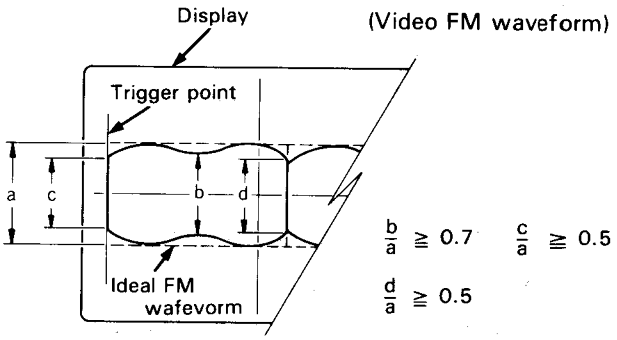

Display
(Video FM waveform)
Trigger point
a
c
b
d
Ideal FM wafevorm
$\frac{b}{a} \geqq 0.7$
$\frac{c}{a} \geqq 0.5$
$\frac{d}{a} \geqq 0.5$

Fig. 1-6-1 FM waveform

2. Adjustment is required if the waveform does not meet the above specifications and also if overall variation of the FM waveform is not linear. In this latter case, portional level decline would occur with even slight tracking deviation to produce noise in the picture.

3. Operate the tracking control and vary the FM waveform from maximum to minimum, then from minimum to maximum. Observe the waveform portion corresponding to the drum input and confirm essentially parallel variation. However, if the variation is in a see-saw pattern, the supply guide roller height requires adjustment.

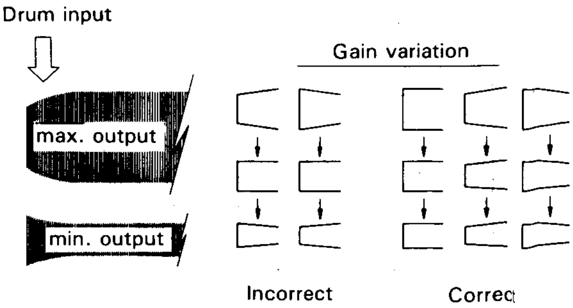

Drum input
Gain variation
max. output
min. output
Incorrect
Correct

Fig. 1-6-2 Input FM waveform

In other words, the tape is not properly following the drum lead at the drum input side. Adjust the supply guide roller height so that the variation is as parallel as possible.

4. Similarly, observe the FM waveform portion corresponding to the drum output and if necessary, adjust the take-up guide roller height so that the variation is as parallel as possible.

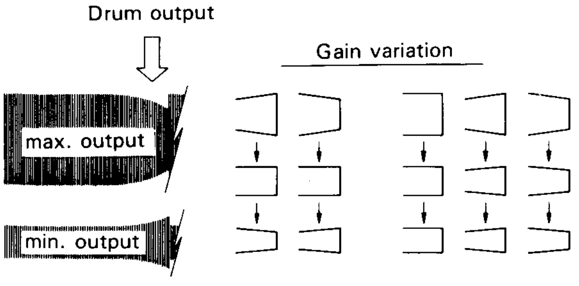


Fig. 1-6-3 Output FM waveform

5. Next, observe the entire FM waveform. So that the overall variation is as parallel and linear as possible, carefully adjust both guide rollers.

6. After adjusting the guide rollers, check for absence of tape wrinkles or creases at the take-up and supply guide poles. If these are observed at the supply guide pole, adjust the guide pole height with attention to the tape transport at the lower flange of the pole. Perform carefully, since this affects the FM waveform risetime. If winkles or creases are observed at the take-up guide pole, adjust the audio/control head inclination (some recent models do not heave ajustable take-up guide poles) with attention to the tape transport at the lower flange of the pole.
Afterwards, again check the FM waveform.

1.6.2 Audio/control head adjustment

Incorrect position of the audio/control head reduces the play-back audio output, impairs S/N and in severe cases, interferes with servo stability due to inability to pickup the control signal.
Observe the audio signal waveform by connectiong an oscilloscope to the audio output test point of the audio circuit or directly to the audio output terminal. In some cases, connecting headphones and directly listening to the sound forms a useful test.

1. Play the stairstep (audio 6 kHz) section of the MH-2 Alignment tape.
2. Adjust the azimuth by turning screw ③ for maximum audio output.
3. Adjust the height by turning screws ①, ② and ③ by small and equal increments (about 45°) at a time for maximum audio output. For ("Normal") stereo models, also adjust for balanced outputs from the right and left channels.

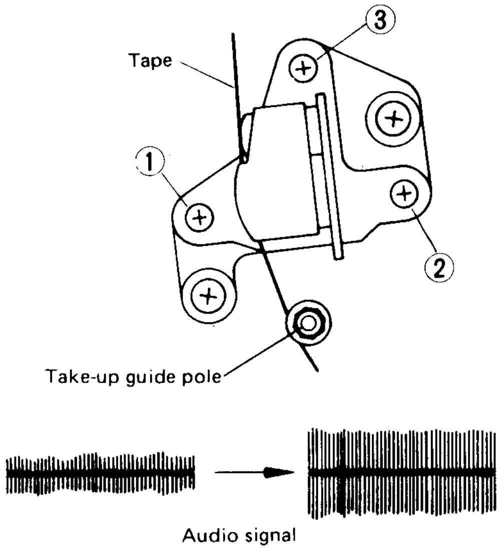


Fig. 1-6-4 A/CTL head adjustment

4. For stereo models, also play the color bar (audio 1 kHz) section of the MH-2 Alignment tape and adjust to eliminate phase difference between the right and left channels.

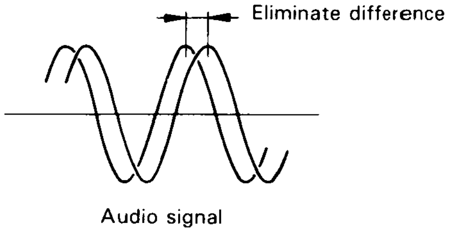


Fig. 1-6-5 Audio phase

5. Again check the FM waveform. If acceptable, carefully tighten the setscrews of the guide rollers. Since this may disturb the FM waveform, check again after tightening the screws.

1.6.3 Control head phase (X Value)

Incorrect adjustment of the X value can cause a time difference between picture and sound play-back. This is more likely to be noticed in the LP mode than the SP mode.
Observe the FM waveform by connecting an oscilloscope to the FM output test point of the video circuit. Trigger the oscilloscope externally with the flipflop signal and set the slope to minus (–) to observe the CH1 waveform. Set the tracking control to the center click (AUTO) postion.

1. Play the stairstep section of the MH-2 Alignment tape.
2. Slightly loosen screws ④ and ⑤ of the audio/control head. Place the A/CTL head positioning tool over screw ④ with the pin of the tool inserted in the adjustment hole near the screw.
3. Turn the tool counter-clockwise to position the audio/control head fully toward the capstan side.
4. Gradually turn the tool clockwise while observing the CH1 FM waveform. At the first output peak, stop turning and immediately tighten screw ⑤ . Then tighten screw ④ .

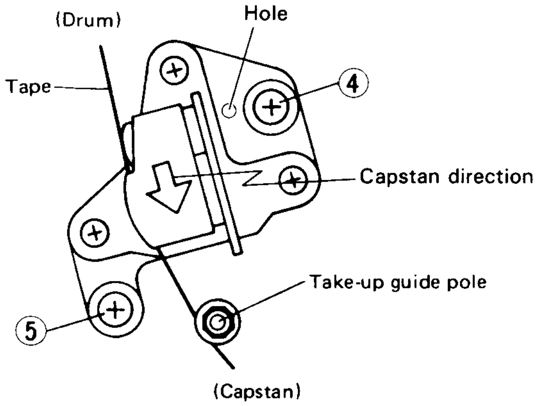


Fig. 1-6-6 Control head phase

5. Operate the tracking contorl and confirm that maximum FM waveform is obtained at the center click position.

1.6.4 Finel checks

1. Supply a video or TV signal input, record and play-back. Confirm that the FM waveform conforms to the video FM waveform specifications (SP and LP modes).
2. For VHS Hi-Fi models, connect an oscilloscope to the audio FM output of the FM audio play-back circuit. Play the FM audio signal (carrier only) of the MH-F2 Alignment tape. Confirm absence of serious dips in the FM waveform.
3. Refer to Electrical Adjustments and perform overall checks and adjustments of the servo, video and audio (including FM audio) circuits.

SECTION 2
ELECTRICAL ADJUSTMENTS

2.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts.
It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

2.1.1 Required test equipment

1. Colour television or monitor
2. Oscilloscope: wide-band, dual-trace, triggered delayed sweep
3. Frequency counter
4. Audio oscillator
5. Audio voltmeter
6. Digital voltmeter
7. Signal generator: RF/IF sweep/marker
8. Signal generator: PAL colour bar, stairstep
9. Recording tape
10. Alignment tapes: (MH-2, MH-F2)

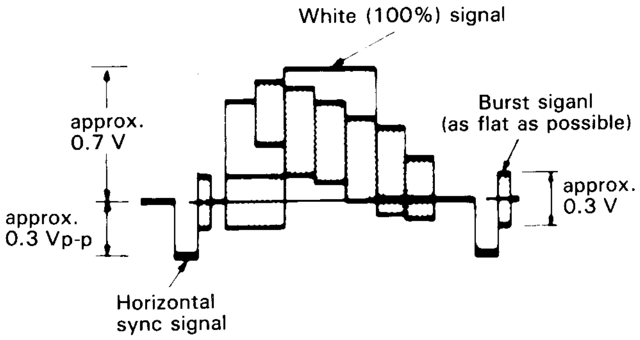

White (100%) signal
Burst siganl (as flat as possible)
approx. 0.7 V
approx. 0.3 Vp-p
approx. 0.3 V
Horizontal sync signal

Fig. 2-1-1 Colour bar signal of pattern generator

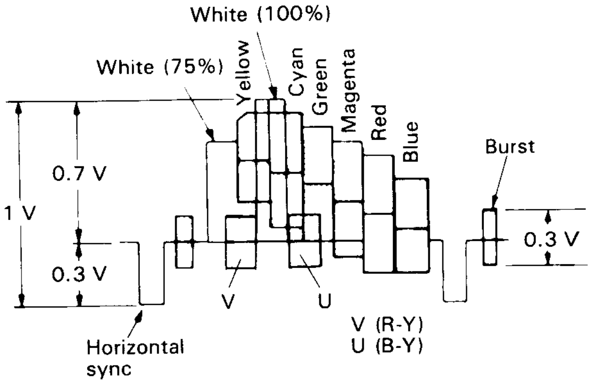

White (100%)
White (75%)
Yellow
Cyan
Green
Magenta
Red
Blue
Burst
0.7 V
1 V
0.3 V
0.3 V
V
U
Horizontal sync
V (R-Y)
U (B-Y)

Fig. 2-1-2 Colour bar signal waveform

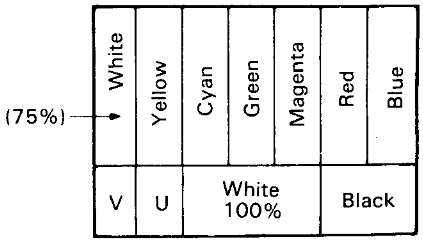

White
Yellow
Cyan
Green
Magenta
Red
Blue
(75%)
V
U
White 100%
Black

Fig. 2-1-3 Colour bar pattern

2.1.2 Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

No.	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
Item	Name assigned to the particular check and adjustment step.
Check Point	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
Adjustment Parts	Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (—) indicates check only.
Signal & Mode	• Input signal required to perform adjustment. Dash (—) indicates that special signal is not required. • Equipment operating mode at time of check or adjustment.
Colour bar	Colour bar signal as video input.
Stairstep	Stairstep signal as video input.
1 kHz	Supply a 1 kHz sinewave as audio input signal.
MH-2 Colour bar	Play colour bar segment of MH-2 alignment tape.
MH-2 Stairstep	Play stairstep segment of MH-2 alignment tape.
MH-2 1 kHz	Play 1 kHz audio signal segment of MH-2 alignment tape.
MH-2 RF sweep	Play RF sweep segment of MH-2 alignment tape.
Stop	Power on and machine in Stop mode.
REC	Recording mode
PB	Playback mode
REC ↓ (another mode)	Use blank tape, record, then play back in the mode specified.
Search	Search (FWDS and REVS) playback mode.
Slow	Slow motion playback mode.
Still	Playback then Pause.
A DUB	Audio dubbing mode.
Description and Waveform	This column provides an explanation of the step, notes, adjustment values and waveform diagrams.

2.2 REGULATOR CIRCUIT ($\boxed{0}\boxed{2}$ REGULATOR board)

Note: Unless otherwise specified, test points and variable resistors are located on the REGULATOR board.

No.	Item	Chick Point	Adjustment Parts	Signal & Mode	Description and Waveform
1	SWD 5.33 V DC Output Voltage	TP2	R15 (5.33 V DC)	REC (TUNER mode)	1. Connect the digital voltmeter to TP2 and TP4 GND. 2. Adjust R15 for 5.33 ± 0.05 V.
2	UNSW 12 V DC Output Voltage	TP1	R6 (12 V DC)	REC (TUNER mode)	1. Connect the digital voltmeter to TP1 and TP3 GND. 2. Adjust R6 for 12.2 ± 0.1 V.

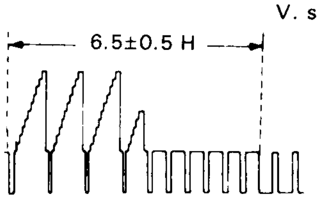
2.3 TIMER CIRCUIT ($\boxed{2}\boxed{1}$ FRONT board)

Note: Unless otherwise specified, test points and variable resistors are located on the TIMER board.

1	Timer Clock	TP2 (OSC)	C3 (TIMER CLOCK)	E-E	1. Connect the frequency counter to TP2 (OSC OUT) and GND. 2. Short GND and TP1 (TEST). Then short the leads of electrolytic capacitor C10 once in order to reset IC1. 3. Adjust C3 for 2048.010 Hz ± 0.002 Hz. **Note:** 1) Resetting IC1 while TP1 and GND are shorted provides the TEST mode.

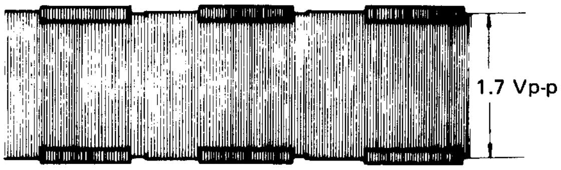
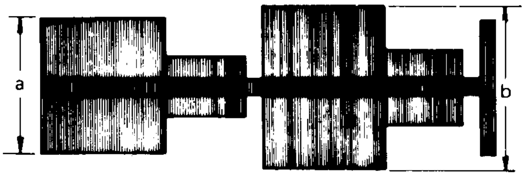
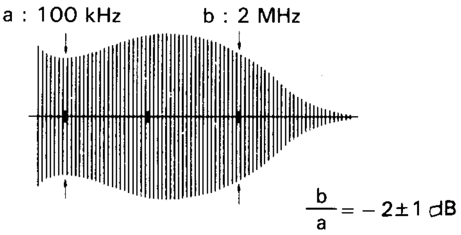
2.4 SERVO CIRCUIT ($\boxed{0}\boxed{3}$ V/M/S board)

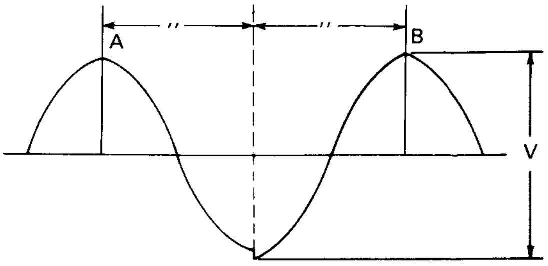
Note: Unless otherwise specified, test points and variable resistors are located on the V/M/S board.

1	PB Switching Point	TP410 (VIDEO OUT) or CN406, pin 3	R27 (PB SW POINT)	• PB • MH-2 Stairstep • Trigger slope (–) • SP	1. Connect an oscilloscope to TP410 or CN406 pin 3 of the V/M/S board. 2. Play back the stairstep segment of MH-2 alignment tape. 3. Trigger the oscilloscope externally (– slope) with the signal from TP11 SERVO board (DRUM FF). 4. Adjust R27 to position the trigger point 6.5 ± 0.5 H from V. sync.  **Fig. 2-4-1**
Note: Before this adjustment "Control head phase adjustment" must be completed.					
2	V. Pulse Position	MONITOR	R29 (V-LOCK)	• Still • REC then PB • Colour bar • SP	1. Record the colour bar signal, then playback. 2. In the Still mode, observe the monitor and adjust R29 for the minimum vertical jitter.

2.5 VIDEO CIRCUIT ($\boxed{0}\boxed{3}$ V/M/S board)

Note: Unless otherwise specified, test points and variable resistors are located on the V/M/S board.

No.	Item	Chick Point	Adjustment Parts	Signal & Mode	Description and Waveform
1	VXO	TP106 (FSC)	R117 (VXO)	• PB • MH-2 Colour bar • SP	1. Connect a frequency counter to TP106. 2. Playback the colour bar segment of MH-2 alignment tape. 3. Adjust R117 for 4.433619 MHz ± 50 Hz.
2	SP REC FM Level	TP402 (REC FM)	R436 (SP REC FM LEVEL)	• Colour bar • REC • SP mode	1. Supply a colour bar input signal. 2. Connect an oscilloscope to TP402. 3. Adjust R436 so that the pedestal level of the vertical blanking component becomes 1.7 Vp-p.  **Fig. 2-5-1**
3	REC Colour Level  **Fig. 2-5-2**	TP104 (PB COL)	R110 (REC COLOUR LEVEL)	• PB • SP mode • REC then PB • Colour bar	1. Connect an oscilloscope to TP104 playback a colour bar segment of the MH-2 and observe colour signal level. 2. Adjust the Tracking control (R401) of the FRONT board for maximum level of the colour waveform and make a note of the higher colour level. 3. Set the Tracking control (R401) to the center detent position. 4. Record the colour bar signal, then playback. Before recording, adjust R110 so that the higher level channel becomes 95 to 105% of the noted level during playback. At this time, confirm that the channel difference is within 3 dB.
4	PB Frequency response	TP410 (VIDEO OUT)	R416 (FREQ RESPONSE)	• Video Sweep • REC ↓ • PB	1. Connect an oscilloscope to TP410. 2. Set the Sharpness control of the FRONT board to center detent position. 3. Record and playback a video sweep (with sync) signal. 4. Adjust R416 so that the 2 MHz level become 0 ± 1 dB (70 – 96%) with reference to 100 kHz.  **Fig. 2-5-3**

No.	Item	Chick Point	Adjustment Parts	Signal & Mode	Description and Waveform
5	SECAM DET (E/EG Models)	TP110 (S DET ADJ)	L111 (1/2 Fh TUNING) R148 (SECAM DETECTOR)	• SECAM colour bar • E-E • REC → PB	1. Connect an oscilloscope to TP110. 2. Adjust L111 so that transition step becomes centered between "A" and "B" as shown in Fig. 2-5-4.  Set this point to center position between points "A" and "B". V = more than 5.5 Vp-p in REC V = 6.0 ± 0.5 Vp-p in PB **Fig. 2-5-4** 3. Record then playback. 4. Adjust R148 for 6.0 ± 0.5 Vp-p.

2.6 AUDIO CIRCUIT ($\boxed{0}\boxed{9}$ AUDIO (FM/NOR) board)

Note: Unless otherwise specified, test points and variable resistors are located on the AUDIO board.

1	Audio Bias Level (LEVEL)	TP2 (BIAS LEVEL)	R128 (BIAS LEVEL)	• REC • SP	1. Connect a digital voltmeter between TP2 and TP1 (GND). 2. Set for REC mode without signal. 3. Adjust R128 for 2.65 mV ± 0.2 mVrms.
2	Audio PB Level	AUDIO OUT	R120 (NOR PB LEVEL)	• REC then PB • SP • LP • INPUL SEL: SC mode	1. Connect a oscilloscope to AUDIO OUT. 2. Supply an audio signal (–20 dBs/1 kHz at RCA Jack) to AUDIO IN and record together with a VIDEO signal, then playback. 3. Adjust R120 so that the audio output level during playback becomes –6 ± 1 dBs for SP mode. 4. In LP mode, confirm that the audio output level during playback becomes –6 ± 2 dBs.

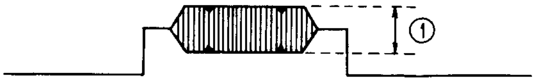
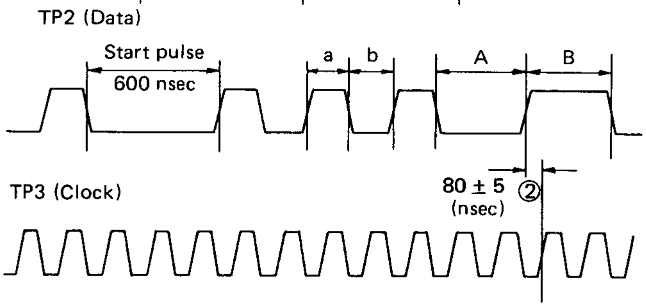
2.7 FM AUDIO CIRCUIT ($\boxed{0}\boxed{9}$ AUDIO (FM/NOR) board)

Note: Unless otherwise noted, test and adjustment points are located on the $\boxed{0}\boxed{9}$ AUDIO (FM/NOR) board.

No.	Item	Chick Point	Adjustment Parts	Signal & Mode	Description and Waveform
1	FM Carrier	TP3	R89 (fo, L-CH) R95 (fo, R-CH)	• No signal • REC	1. Connect a frequency counter to TP3 and adjust R89 (fo, L-CH) to obtain frequency of 1.4 MHz ± 5 kHz. 2. Connect the frequency counter to TP3 and adjust R95 (fo, R-CH) to obtain frequency of 1.8 MHz ± 5 kHz.
2	REC FM Level	TP3	R54 (REC FM)	• No signal • REC	1. Without audio input signal, set for the REC mode. 2. Connect the oscilloscope to TP3 and adjust R54 to obtain 2.3 Vp-p ± 0.1 V.
3	E-E Level	AUDIO OUT (RCA Jack)	R148 (E-E, L-CH) R147 (E-E, R-CH)	• E-E • Input: External • 1 kHz, –20 dBs (RCA Jack) • Audio Monitor: Hi-Fi Stereo • INPUT SEL: SC mode	1. Supply 1 kHz, –20 dBs signals to the audio inputs (both channels). 2. Set the Hi-Fi REC level control of the FRONT board to center detent position. 3. Adjust R148 (L-CH) and R147 (R-CH) to obtain –6 ± 0.5 dBs at the audio outputs, respectively.
4	PB Level	AUDIO OUT (RCA Jack)	R103 (PB LEVEL, L-CH) R107 (PB LEVEL, R-CH)	• PB • Audio Monitor: Hi-Fi Stereo • MH-F2: 1 kHz	1. Play 1 kHz ± 50 kHz deviation signal of MH-F2 alignment tape. 2. Adjust R103 (L-CH) and R107 (R-CH) to obtain –6 ± 0.5 dBs audio output levels.
5	Level Indicators	FDP	R32 (IND, L-CH) R39 (IND. R-CH)	• E-E • Input: External • 1 kHz, –20 dBs (RCA Jack) • Stop mode	1. Supply 1 kHz, –20 dBs signals to the audio inputs (both channels). 2. Set the LEVEL IND. switch to AUDIO LEVEL. 3. In the E-E mode, adjust the front panel Hi-Fi REC LEVEL controls for –6 ± 0.5 dBs audio output levels. 4. Adjust R32 to where the FDP level indicators shown 0 dB (all white LEDs light). 5. In the same manner, adjust R39 for the R (CH2) channel.

2.8 VPS CIRCUIT (18 VPS board: E/EG models only)

Note: Unless otherwise specified, test points and variable resistors are located on the VPS board.

No.	Item	Chick Point	Adjustment Parts	Signal & Mode	Description and Waveform
1	OsclIator	TP6	T1 (OSC)	• VIDEO Sweep • Input level: 2 Vp-p	1. Connect TP5 to VDD (+5 V) and TP4 to ground. 2. Observe the TP6 waveform on an oscilloscope. 3. Adjust the inner core of coil T1 so that maximum (peak) appears as shown by ① in the figure.  **Fig. 2-8-1**
2	DUTY Check	TP2 (DATA) TP3 (CLOCK)	–	• VIDEO Sweep • Input Level : 2 Vp-p	1. Refer to the figure and check that a : b = 200 ± 10 (nsec) : 200 ∓ 10 (nsec) A : B = 400 ± 20 (nsec) : 400 ∓ 20 (nsec) The start pulse is positioned ahead of the data and is 600 nsec only at this point.  TP2 (Data) Start pulse 600 nsec a b A B TP3 (Clock) 80 ± 5 (nsec) ② **Fig. 2-8-2**
3	Timing	TP2 TP3	T1 (Timing)	• VIDEO Sweep • Input level : 2 Vp-p	Adjust T1 so that time between data rise and clock rise (② in Figune 2-8-2) is 80 ± 5 nsec.

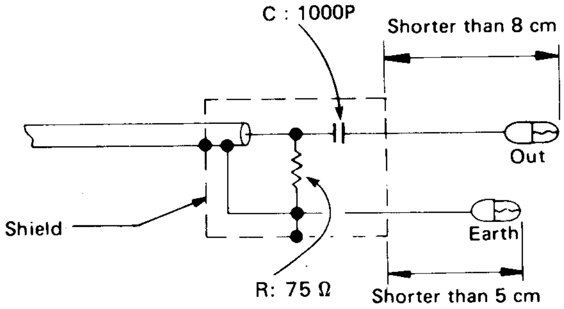
2.9 TUNER/IF CIRCUIT (07 TUNER/IF board)

Note: Unless otherwise specified, test points and variable resistors are located on the TUNER/IF board.

<table>
<tr><th>No.</th><th>Item</th><th>Check Point</th><th>Adjustment Parts</th><th>Signal & Mode</th><th>Description and Waveform</th></tr>
<tr><td colspan="6">

Equipment required.

1. Oscilloscope
2. IF sweep signal generator with suitable markers (PIF, SIF, etc.)
3. DC power supplies – For power bias (12.0 V)
for IF AGC bias (approx. 5 V variable)
4. Sweeper probe (seep signal supply cable) as shown below.



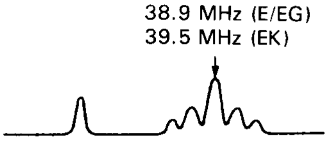
Sweeper probe

Fig. 2-9-1

</td></tr>
<tr><td>1.</td><td>VCO

E/EG 38.9MHz
EK 39.5MHz</td><td>IC1, pin 28</td><td>T2
(VCO)</td><td>• Sweep
• Generator</td><td>

1. Use the probe shown in the figure (for IF adjustment) and connect IF sweep signal to the SAW 1 input terminal.
2. Apply DC 4.5 V to pin 6 of IC1 (IF AGC). Connect oscilloscope to pin 28 (VIDEO DET OUT) and adjust T2 to align the waveform with the frequency marker indicated at left.
Note:
Sweep generator output level is 70 dBμ/75 Ω.



VCO and sweep signal

Fig. 2-9-2

</td></tr>
<tr><td>2.</td><td>Front
End IF

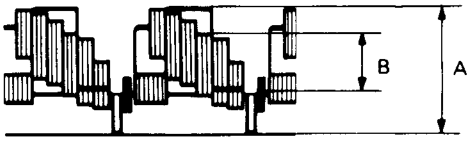
E/EG 38.15MHz
EK 39.5MHz</td><td>TUNER
(Inside the tuner unit)</td><td>IF Coil</td><td>• Sweep
• Generator</td><td>

1. Use the IF adjustment probe to connect the IF sweep signal to the front-end (TUNER) test point (TP).
2. Use the IF adjustment prove to connect the SAW 1 input terminal with the IF detector.
3. Adjust the IF core of the front end for maximum frequency.

</td></tr>
<tr><td>3</td><td>FTZ Trap
(E/EG only)</td><td>IC1, pin 28</td><td>T1
(FTZ TRAP)</td><td>• Colour Bar</td><td>

1. Supply a 32.4 MHz with 400 Hz AM modulation signal to the Tuner TP.
2. Connect oscilloscope to pin 28 of IC1 and adjust the output side core of T1 for minimum level.

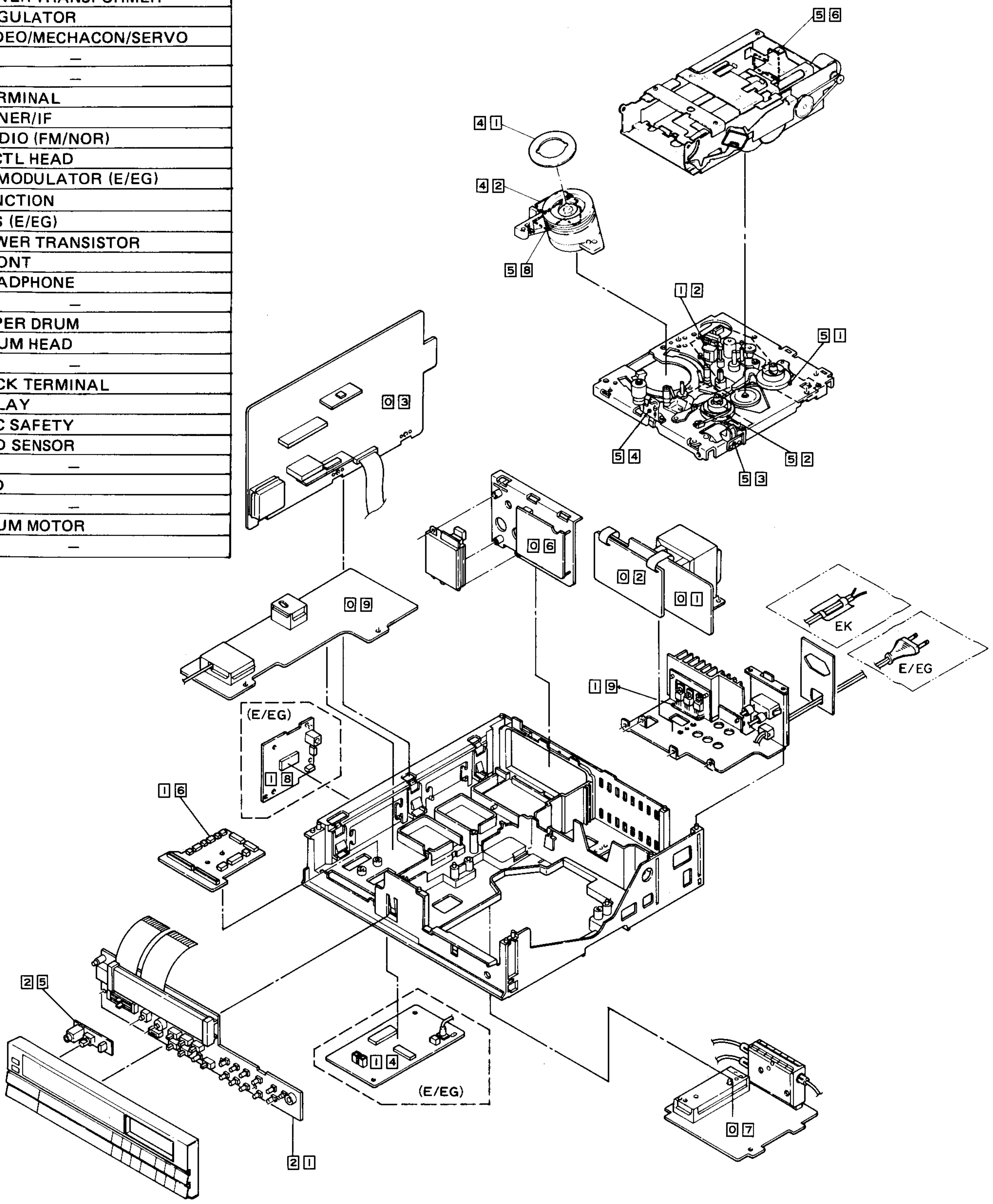
</td></tr>
</table>

No.	Item	Chick Point	Adjustment Parts	Signal & Mode	Description and Waveform
4	RF AGC	IF terminal	R11 (RF AGC)	• Colour Bar	1. Receive a colour bar signal and connect oscilloscope to the front end IF terminal. 2. Adjust R11 for maximum level. Then again turn R11 to reduce the level by 10 dB.
5	VPS Y Level (E/EG only)	CN4, pin 1 (VPS OUT)	R16 (VPS Y LEVEL)	• Modulated signal	1. Receive an 87.5% modulated signal. Adjust R16 to obtain a maximum Y level (including sync) of 2.0 Vp-p from pin 1 (VPS OUT) of CN4.
6	Colour Level	CN2, pin 3 (VIDEO OUT)	R42 (COLOUR LEVEL)	• Colour Bar	1. Receive a colour bar signal. With Y level taken as 100%, adjust R42 for a magneta level of 48% at pin 3 (VIDEO OUT) of CN2.  B: magenta E/EG A:B = 1:0.44 EK A:B = 1:0.48 Fig. 2-9-3
7	Audio Level (EK only)	CN2, pin 5 (AUDIO OUT)	R32 (AUDIO LEVEL)	• Colour Bar • 1 kHz audio RF signal	1. Receive a colour bar signal and 1 kHz (±50 kHz dev.) audio RF signal. 2. Adjust R32 for −14 dBs (4.5 Vp-p) at pin 5 (AUDIO OUT) of CN2.

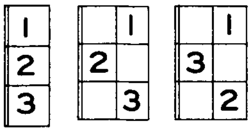
SECTION 3
CHARTS AND DIAGRAMS

3.1 CIRCUIT BOARD LOCATIONS AND GENERAL INFORMATION

No.	NAMES
01	POWER TRANSFORMER
02	REGULATOR
03	VIDEO/MECHACON/SERVO
04	–
05	–
06	TERMINAL
07	TUNER/IF
09	AUDIO (FM/NOR)
12	A/CTL HEAD
14	DEMODULATOR (E/EG)
16	JUNCTION
18	VPS (E/EG)
19	POWER TRANSISTOR
21	FRONT
25	HEADPHONE
30	–
41	UPPER DRUM
42	DRUM HEAD
50	–
51	DECK TERMINAL
52	RELAY
53	REC SAFETY
54	END SENSOR
55	–
56	LED
57	–
58	DRUM MOTOR
60	–

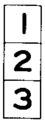

56
41
42
58
12
51
03
54
52
53
06
02
01
EK
E/EG
09
19
(E/EG)
18
16
25
14
(E/EG)
07
21

3.1.1 Connections

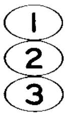


: Connector

①
②
③
: Direct connection



: Board in connector



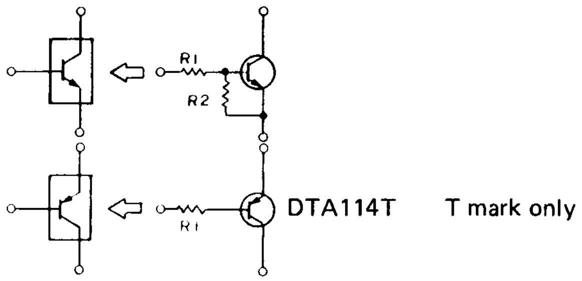
: Connected pattern in the board.

3.1.2 Indications

COUNT UP : Active only at high.

$\overline{\text{COUNT DOWN}}$: Active only at low.

3.1.3 Digital transistor



Note:
The digital transistor includes built in resistors.
It features small size and high reliability.
Both PNP and NPN types are available.

Uses:
Inverter, Interface, driver circuits.

3.1.4 Signal flow in the schematic

➡ Recording signal path
⇨ Playback signal path
➩ REC/PB signal path

3.1.5 Schematic diagram values

Unless otherwise specified.

1. All resistance values are in ohms, 1/6 W, 1/8 W (refer to parts list).
2. All capacitance values are in μF, (P; PF).
3. All inductance values are in μH, (m; mH).
4. All diodes are 1SS133 or MA165, (refer to parts list).
5. Voltages are DC-measured with a digital voltmeter during recording (SP mode) and playback (SP mode) with alignment tape. Where voltages differ between recording and playback, the voltage during playback is shown in parentheses.
6. Waveforms (VIDEO System) are measured with a color bar during recording (SP mode) and playback (SP mode) with alignment tape.
7. Waveforms (AUDIO System) are measured with 1 kHz (–8 dBs) during recording and playback with alignment tape (1 kHz).
8. Shaded (▨) Parts are critical for safety.
   Replace only with specified parts numbers.

3.2 KEY TO ABBREVIATIONS

A
A/CTL : Audio/Control
ADC : Analog to Digital Converter
ADD : Adder
ADJ : Adjustment
A DUB : Audio Dubbing
AE : Audio Erase
AEF : Automatic Editing Function
AFC : Automatic Frequency Control
AFT : Automatic Fine Tuning
AH : Audio Head
AL : After Loading
ALC : Automatic Ligh Compensation
Automatic Level Control
ALM : Alarm
AM : Amplitude Modulation
AMP : Amplifier
ANT : Antenna
APC : Automatic Pedestal Control
Automatic Phase Control
APL : Average Picture Level
ASS'Y : Assembly
ATT : Attenuator
AUD : Audio
AUTO : Automatic
AUX : Auxiliary

B
B : Base
BAL : Balance
BATT : Battery
BLK : Black, Blanking
BLU : Blue
BPF : Bandpass Filter
BRK : Brake
BRN : Brown
BUFF : Buffer
BW or B/W : Black and White

C
C : Capacitance, Collector, Color, Ceramic
CAP : Capstan, Capacitor
CARR : Carrier
CASS : Cassette
CCD : Charge Coupled Device
CCT : Circuit
CD : Count Down
CF : Ceramic Filter, Color Frame
CE : Chip Enable
CH : Channel
CHROMA : Chrominance
CLK : Clock
CLR : Clear
CMOS : Complementary Metal Oxide Semiconductor
CMD : Command
CNT : Count, Counter
CONV : Converter
COL : Color
COM : Common
COMB : Comb Filter
COMP : Comparator, composite, compensation
CONN : Connector
CP : Circuit Protector, Clamp Pulse
CPC : Capstan Phase Control
CTL : Control

D
D : Drum, Digital, Diode, Drain
DAC : Digital to Analog Converter
DD : Direct Drive
DEC : Decoder
DEMOD : Demodulator
DEMUX : Demultiplexer
DET : Detector
DEV : Deviation
DIF : Differential
DISCR : Discriminator
DL : Delay Line
DOC : Dropout Compensator
DPC : Drum Phase Control
DYAC : Dynamic Aperture Control

E
E : Edit, Emitter
EDP : Electronic Data Processing
E-E : Electric to Electric
EF : Emitter-Follower
EMP : Emphasis
ENC : Encoder
EN : Enable
ENV : Envelope
EP : Extended Play
EQ : Equalizer
ES : Electronic Switch
ESNS : End Sensor
EXP : Expander
EXT : External

F
F : Farad, Fuse
F ADV : Frame Advance
FE : Full Erase
FET : Field Effect Transistor
FF : Fast Forward
Flipflop
FM : Frequency Modulation
FMA : FM Audio
FR : Full Recording, Frame, Fusible Resistor
F REQ : Frequency
F-V CONV : Frequency to Voltage Converter
FWD : Forward
FWDS : Forward Search

G
G : Green, Gate, Grid
GEN : Generator
GND : Ground
GRN : Green
GRY : Gray

H
H : High, Henry, Hour
HBF : Horizontal Burst Flag
HD : Horizontal Drive
HG : Hall Generator
HPF : Highpass Filter
HRC : Harmonic Related Carrier

I
ID : Identification (Pulse)
IF : Intermediate Frequency
IFR : Infrared
IFT : Intermediate Frequency Transformer
IND : Indicator
INH : Inhibit
INS : Insert
INT : Internal, Interrupt
INV : Inverter
I/O : Input/Output
IR : Infrared

L
L : Low, Left
LCD : Liquid Crystal Display
LED : Light Emitting Diode
LIN : Linearity
LIM : Limiter
LOAD : Loading (Cassette)
LP : Long Play
LPF : Lowpass Filter
LSB : Lower Side band

M
M : Motor, Mega
MAX : Maximum
MDA : Motor Drive Amplifier

MECHACON : Mechanism Control
MIC : Microphone
MIN : Minimum
MIX : Mixer, Mixing
MMV : Monostable Multivibrator
MNOS : Metal Nitride Oxide Semiconductor
MOD : Modulation, Modulator
MODEM : Modulator-Demodulator
MON : Monitor
MOS : Metal Oxide Semiconductor
MPX : Multiplexer, Multiplex
MS : Mode Select
MUT : Muting

N
NAND : Not-And
NC : Not Connected, Normally Closed
NFB : Negative Feedback
NLN : Non-Linear
NO : Normally Open
NOR : Normal, Not-Or
NR : Noise Reduction

O
OPAMP : Operational Amplifier
OP : Operation
ORN : Orange
OSC : Oscillator

P
PB : Playback
PC : Photocoupler, Pulse Counter
PCM : Pulse Code Modulation
PGM : Program
PG : Pulse Generator
PI : Photo Interrupter
PIF : Picture Intermediate Frequency
PLA : Programmable Logic Array
PLL : Phase Locked Loop
p-p : Peak-to-Peak
POS : Position
PREAMP : Preamplifier
P/S : Pause/Still
PSC : Pulse Swallowing Control
PU : Pickup
PUT : Programmable Unijunction Transistor
PWM : Pulse Width Modulation
PWR : Power

Q
Q : Quality Factor

R
R : Red, Right
RA : Resistor Array
RAM : Random Access Memory
REC : Recording
REG : Regulated, Regulator
REF : Reference
REM : Remote
REMOCON : Remote Control (Unit)
REV : Reverse
REVS : Reverse Search
REW : Rewind
RF : Radio Frequency
ROM : Read Only Memory
RST : Reset
R/P : Record/Playback
RPT : Repeat
RT : Rotary Transformer
RUN : Running
RY : Relay

S
SAP : Second Audio Program
SAW : Sawtooth, Surface Acoustic Wave
SC : Subcarrier, Simulcast
SCH : Search
SEL : Select, Selector
SENS : Sensor
SEP : Separator
SF : Source Follower
SFF : Short Fast Forward
SIF : Sound Intermediate Frequency
SN : Signal to Noise Ratio
SP : Standard Play
SREW : Short Rewind
S/S : Slow/Still
SSNS : Start Sensor
STD : Strobe Data, Standard
SUP : Supply
SW : Switch
SWD : Switched
SYNC : Synchronization

T
TP : Test Point
TPZD : Trapezoid
TR : Transistor, Trimmer
Trans : Transformer
TU : Take-Up
TEN : Tension
TF : Thermal Fuse
TK : Tracking
TNR : Tuner
TIM : Timing

U
UL : Unloading
UNREG : Unregulated
UNSW : Unswitched

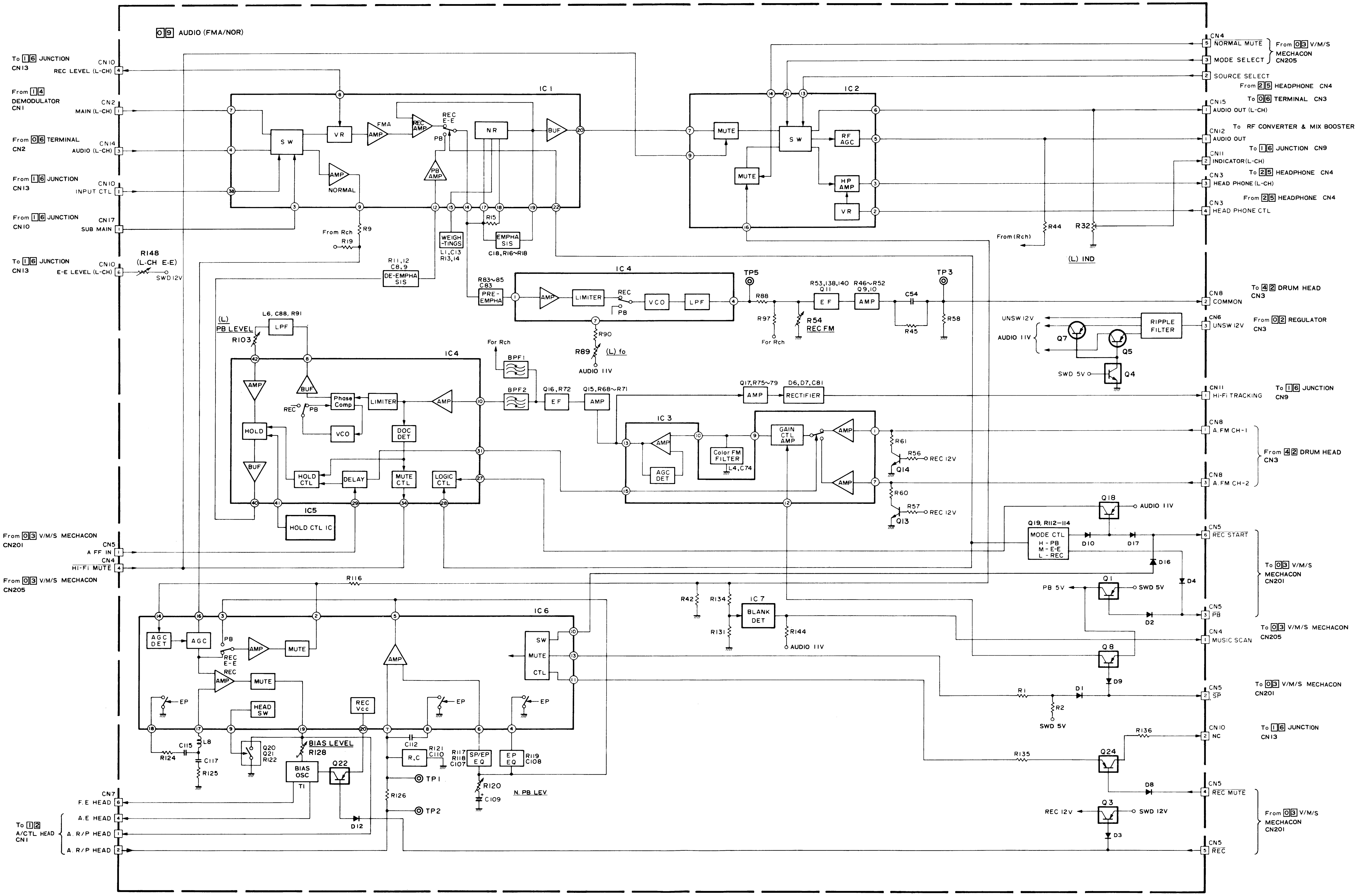
V
V : Volt, Vertical
VCO : Voltage Controlled Oscillator
VD : Vertical Drive
VIF : Video Intermediate Frequency
VS : Video and Sync
VXO : Variable Crystal Osxillator
VLT : Violet
V/T : Video/Television
V/U : VHF/UHF
VSCH : Variable Search

W
WHT : White
W & D : White and Dark
WARN : Warning

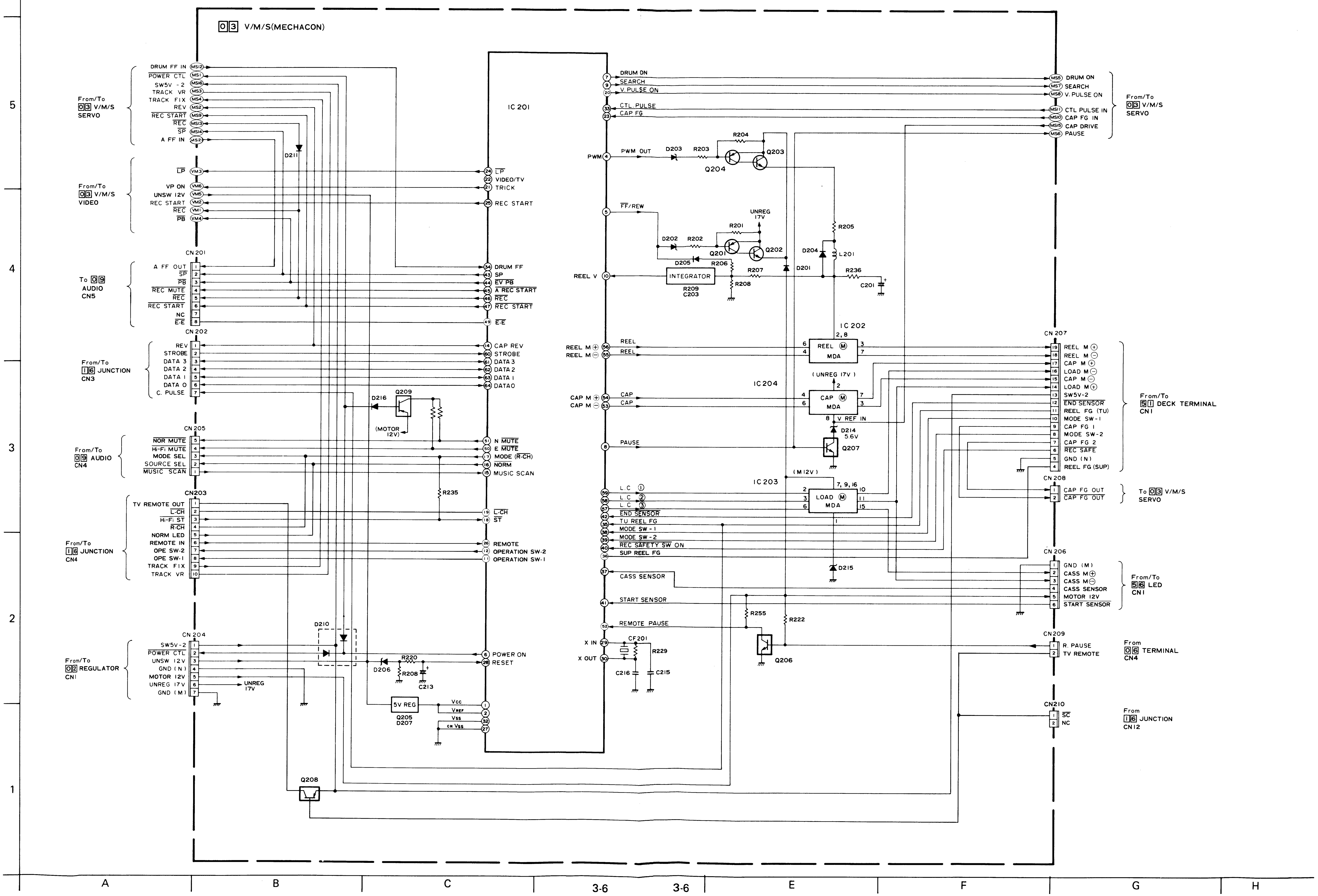
X
XTAL : Crystal

Y
Y : Luminance
YEL : Yellow

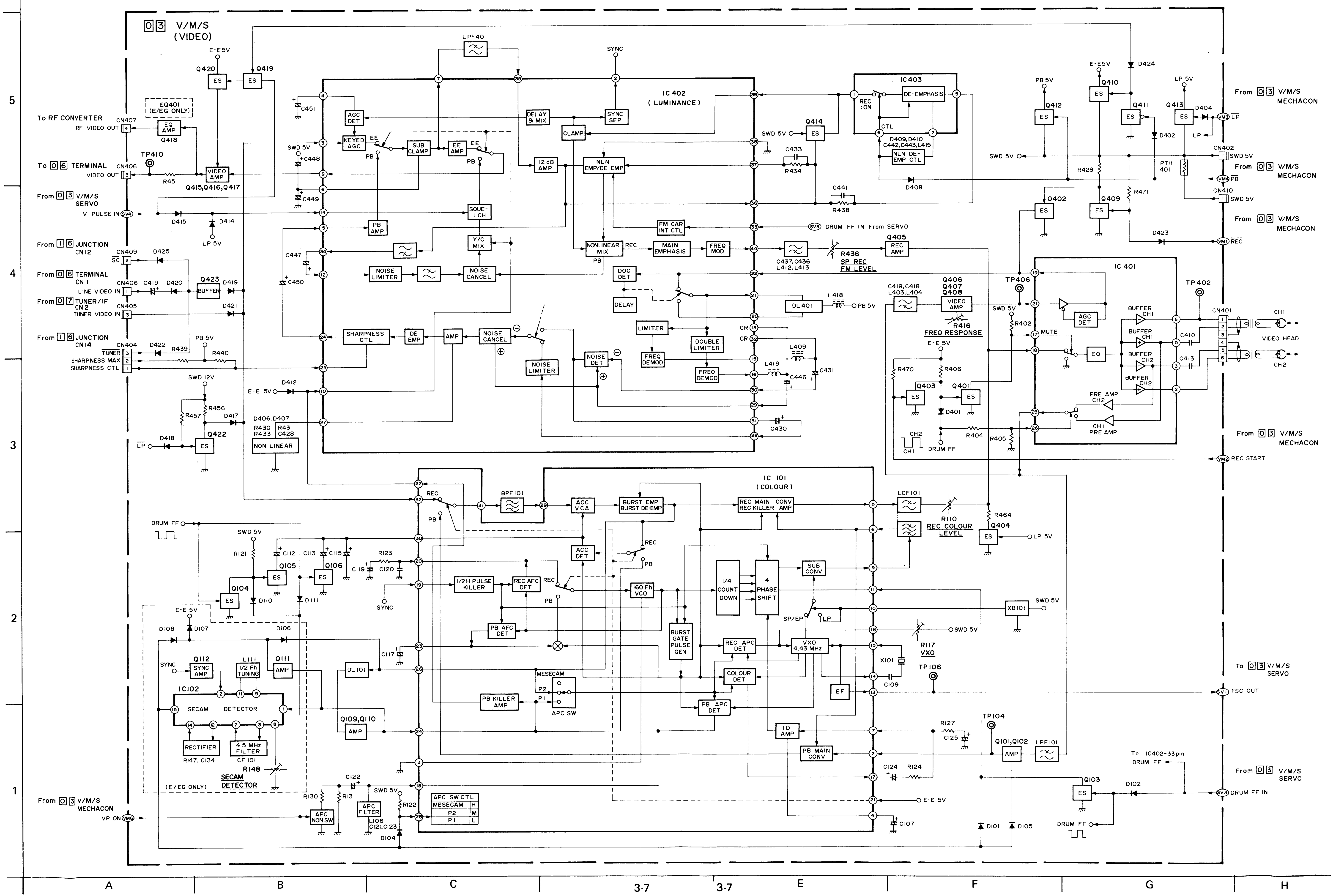
3.3 FM/NORMAL AUDIO BLOCK DIAGRAM


09 AUDIO (FMA/NOR)
To 16 JUNCTION CN13
CN10 REC LEVEL (L-CH)
From 14 DEMODULATOR CN1
CN2 MAIN (L-CH)
From 06 TERMINAL CN2
CN14 AUDIO (L-CH)
From 16 JUNCTION CN13
CN10 INPUT CTL
From 16 JUNCTION CN10
CN17 SUB MAIN
To 16 JUNCTION CN13
CN10 E-E LEVEL (L-CH)
R148 (L-CH E-E)
SWD 12V
IC1
SW
VR
FMA AMP
REC AMP
REC E-E PB
NR
BUF
AMP NORMAL
PB AMP
WEIGH-TINGS L1, C13 R13, 14
EMPHA SIS C18, R16~R18
R15
From Rch R9 R19
R11, 12 C8, 9 DE-EMPHA SIS
R83~85 C83 PRE-EMPHA
IC4
AMP
LIMITER
REC PB
VCO
LPF
R90
R89 (L) fo
AUDIO 11V
TP5
R88
R97
For Rch
R53, 138, 140 Q11 EF
R46~R52 Q9, 10 AMP
C54
R45
TP3
R58
R54 REC FM
(L) PB LEVEL
R103
L6, C88, R91 LPF
IC4
AMP
BUF
Phase Comp
LIMITER
REC PB
VCO
HOLD
BUF
DOC DET
HOLD CTL
DELAY
MUTE CTL
LOGIC CTL
IC5 HOLD CTL IC
For Rch
BPF1
BPF2
Q16, R72 EF
Q15, R68~R71 AMP
Q17, R75~79 AMP
D6, D7, C81 RECTIFIER
IC3
AMP
AGC DET
Color FM FILTER L4, C74
GAIN CTL AMP
AMP
AMP
R61
R56 REC 12V
Q14
R60
R57 REC 12V
Q13
IC2
MUTE
MUTE
SW
RF AGC
HP AMP
VR
From (Rch)
R44
R32
(L) IND
CN4 NORMAL MUTE
CN4 MODE SELECT
From 03 V/M/S MECHACON CN205
SOURCE SELECT
From 25 HEADPHONE CN4
CN15 To 06 TERMINAL CN3 AUDIO OUT (L-CH)
CN12 To RF CONVERTER & MIX BOOSTER AUDIO OUT
CN11 To 16 JUNCTION CN9 INDICATOR (L-CH)
CN3 To 25 HEADPHONE CN4 HEAD PHONE (L-CH)
CN3 From 25 HEADPHONE CN4 HEAD PHONE CTL
CN8 COMMON
To 42 DRUM HEAD CN3
UNSW 12V
AUDIO 11V
Q7 Q5
RIPPLE FILTER
CN6 UNSW 12V
From 02 REGULATOR CN3
SWD 5V Q4
CN11 Hi-Fi TRACKING
To 16 JUNCTION CN9
CN8 A.FM CH-1
CN8 A.FM CH-2
From 42 DRUM HEAD CN3
Q18 AUDIO 11V
Q19, R112~114 MODE CTL H-PB M-E-E L-REC
D10 D17 D16 D4
CN5 REC START
To 03 V/M/S MECHACON CN201
Q1 PB 5V SWD 5V
D2
CN5 PB
CN4 MUSIC SCAN
To 03 V/M/S MECHACON CN205
Q8
D9
R1 D1 R2 SWD 5V
CN5 SP
To 03 V/M/S MECHACON CN201
R136
CN10 NC
To 16 JUNCTION CN13
R135 Q24
D8
CN5 REC MUTE
Q3 REC 12V SWD 12V
D3
CN5 REC
From 03 V/M/S MECHACON CN201
From 03 V/M/S MECHACON CN201
CN5 A FF IN
CN4 HI-FI MUTE
From 03 V/M/S MECHACON CN205
R116
R42 R134 R131
IC7 BLANK DET
R144 AUDIO 11V
IC6
AGC DET
AGC
PB REC E-E
AMP
MUTE
REC
AMP
MUTE
AMP
SW MUTE CTL
EP
EP
EP
HEAD SW
REC Vcc
C115 L8
R124 C117 R125
Q20 Q21 R122
BIAS LEVEL R128
BIAS OSC T1
Q22
D12
C112
R,C R121 C110
R117 R118 C107 SP/EP EQ
EP EQ R119 C108
R120 C109
N. PB LEV
TP1
TP2
R126
CN7 F.E HEAD
A.E HEAD
A. R/P HEAD
A. R/P HEAD
To 12 A/CTL HEAD CN1

3.4 MECHACON BLOCK DIAGRAM

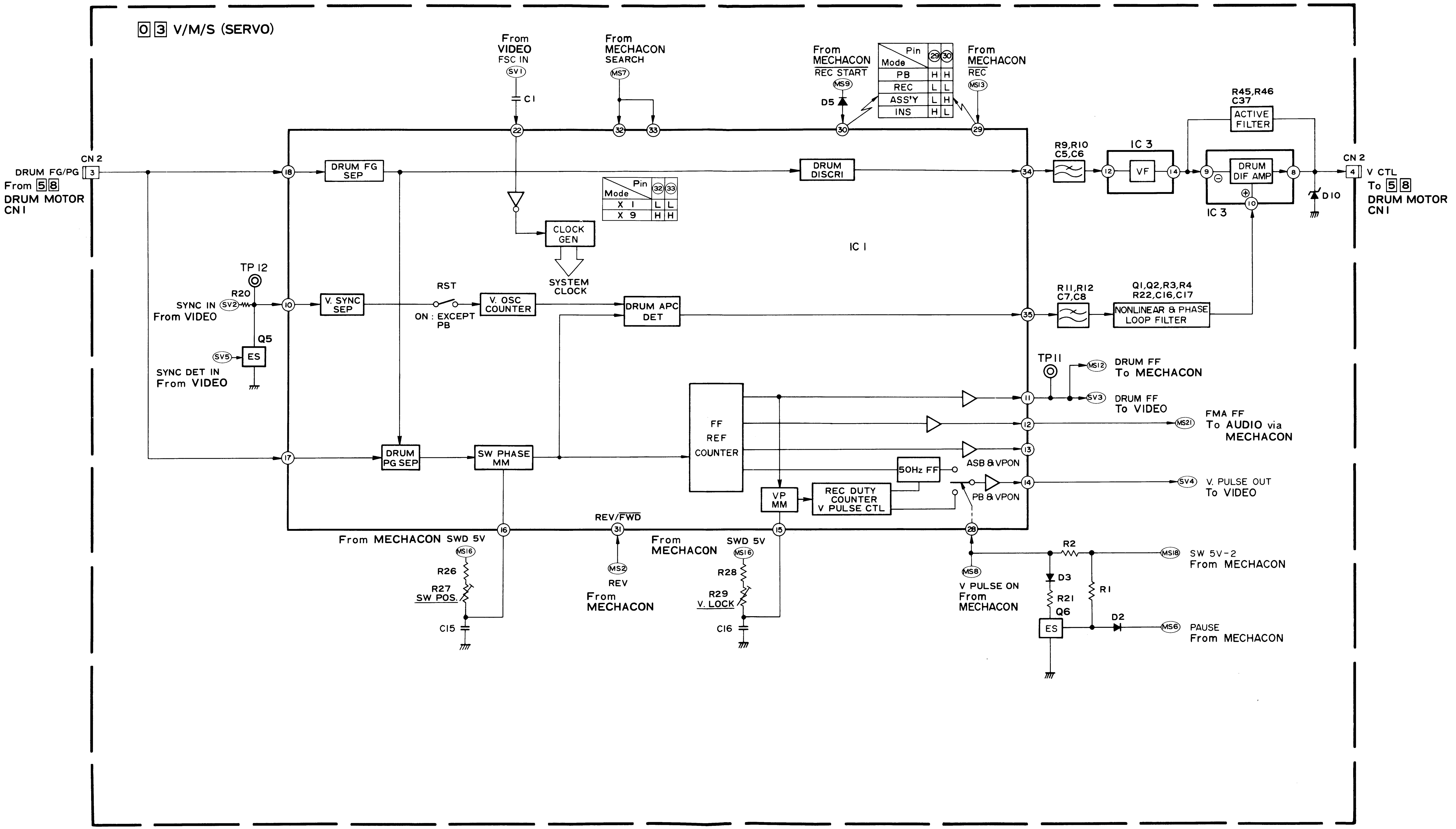

03 V/M/S(MECHACON)
From/To 03 V/M/S SERVO
DRUM FF IN MS12
POWER CTL MS1
SW5V - 2 MS16
TRACK VR MS3
TRACK FIX MS4
REV MS2
REC START MS9
REC MS13
SP MS14
A FF IN MS2
D211
From/To 03 V/M/S VIDEO
LP VM3
VP ON VM6
UNSW 12V VM5
REC START VM2
REC VM1
PB VM4
CN 201
To 09 AUDIO CN5
A FF OUT 1
SP 2
PB 3
REC MUTE 4
REC 5
REC START 6
NC 7
E-E 8
CN 202
From/To 16 JUNCTION CN3
REV 1
STROBE 2
DATA 3 3
DATA 2 4
DATA 1 5
DATA 0 6
C. PULSE 7
D216
Q209
(MOTOR 12V)
CN 205
From/To 09 AUDIO CN4
NOR MUTE 5
Hi-Fi MUTE 4
MODE SEL 3
SOURCE SEL 2
MUSIC SCAN 1
R235
CN203
From/To 16 JUNCTION CN4
TV REMOTE OUT 1
L-CH 2
Hi-Fi ST 3
R-CH 4
NORM LED 5
REMOTE IN 6
OPE SW-2 7
OPE SW-1 8
TRACK FIX 9
TRACK VR 10
CN 204
From/To 02 REGULATOR CN1
SW5V-2 1
POWER CTL 2
UNSW 12V 3
GND (N) 4
MOTOR 12V 5
UNREG 17V 6
GND (M) 7
UNREG 17V
D210
D206
R220
R208
C213
5V REG
Q205 D207
Vcc
VREF
Vss
CH Vss
Q208
IC 201
24 LP
22 VIDEO/TV
21 TRICK
25 REC START
34 DRUM FF
43 SP
44 EV PB
45 A REC START
46 REC
47 REC START
49 E-E
14 CAP REV
60 STROBE
61 DATA 3
62 DATA 2
63 DATA 1
64 DATA 0
51 N MUTE
50 E MUTE
17 MODE (R-CH)
16 NORM
15 MUSIC SCAN
19 L-CH
18 ST
26 REMOTE
12 OPERATION SW-2
11 OPERATION SW-1
6 POWER ON
28 RESET
1
2
32
27
7 DRUM ON
9 SEARCH
20 V. PULSE ON
33 CTL PULSE
23 CAP FG
PWM 4
PWM OUT
D203
R203
R204
Q204
Q203
5 FF/REW
UNREG 17V
R201
D202
R202
Q201
Q202
D205
R206
R205
D204
L201
D201
REEL V 10
INTEGRATOR
R209 C203
R207
R208
R236
C201
IC 202
2, 8
REEL M⊕ 56
REEL M⊖ 55
REEL
REEL
6
4
REEL M MDA
3
7
(UNREG 17V)
IC 204
2
CAP M⊕ 54
CAP M⊖ 53
CAP
CAP
CAP M MDA
8 V REF IN
D214 5.6V
8 PAUSE
Q207
(M 12V)
IC 203
7, 9, 16
59 L.C 1
58 L.C 2
57 L.C 3
LOAD M MDA
10
11
15
1
42 END SENSOR
35 TU REEL FG
38 MODE SW-1
39 MODE SW-2
40 REC SAFETY SW ON
36 SUP REEL FG
D215
37 CASS SENSOR
41 START SENSOR
52 REMOTE PAUSE
R255
R222
Q206
X IN 29
X OUT 30
CF201
R229
C216
C215
MS5 DRUM ON
MS7 SEARCH
MS8 V. PULSE ON
MS11 CTL PULSE IN
MS10 CAP FG IN
MS15 CAP DRIVE
MS6 PAUSE
From/To 03 V/M/S SERVO
CN 207
From/To 51 DECK TERMINAL CN1
19 REEL M⊕
18 REEL M⊖
17 CAP M⊕
16 LOAD M⊖
15 CAP M⊖
14 LOAD M⊕
13 SW5V-2
12 END SENSOR
11 REEL FG (TU)
10 MODE SW-1
9 CAP FG 1
8 MODE SW-2
7 CAP FG 2
6 REC SAFE
5 GND (N)
4 REEL FG (SUP)
CN 208
1 CAP FG OUT
2 CAP FG OUT
To 03 V/M/S SERVO
CN 206
From/To 56 LED CN1
1 GND (M)
2 CASS M⊕
3 CASS M⊖
4 CASS SENSOR
5 MOTOR 12V
6 START SENSOR
CN209
1 R. PAUSE
2 TV REMOTE
From 06 TERMINAL CN4
CN210
1 SC
2 NC
From 16 JUNCTION CN12
6
5
4
3
2
1
A
B
C
E
F
G
H

3.5 VIDEO BLOCK DIAGRAM


03 V/M/S (VIDEO)
To RF CONVERTER CN407 RF VIDEO OUT
EQ401 (E/EG ONLY)
EQ AMP Q418
TP410
To 06 TERMINAL CN406 VIDEO OUT
R451
VIDEO AMP Q415,Q416,Q417
From 03 V/M/S SERVO V PULSE IN
D415 D414 LP 5V
From 16 JUNCTION CN12 CN409 SC D425
From 06 TERMINAL CN1 CN406 LINE VIDEO IN C419 D420 Q423 BUFFER D419
From 07 TUNER/IF CN2 CN405 TUNER VIDEO IN D421
From 16 JUNCTION CN14 CN404 TUNER SHARPNESS MAX SHARPNESS CTL D422 R439 PB 5V R440
SWD 12V R456 R457 D417 D418 LP Q422 ES
E-E5V Q420 ES Q419 ES
LPF401 SYNC
IC402 (LUMINANCE)
C451 AGC DET KEYED AGC EE PB SUB CLAMP EE AMP EE PB
SWD 5V C448 C449
DELAY & MIX SYNC SEP CLAMP
12 dB AMP NLN EMP/DE EMP
SQUELCH PB AMP Y/C MIX
C447 C450 NOISE LIMITER NOISE CANCEL
FM CAR INT CTL NONLINEAR MIX REC PB MAIN EMPHASIS FREQ MOD
SHARPNESS CTL DE EMP AMP NOISE CANCEL NOISE LIMITER NOISE DET
DOC DET DELAY LIMITER DOUBLE LIMITER FREQ DEMOD FREQ DEMOD
E-E 5V D412
D406,D407 R430 R431 R433 C428 NON LINEAR
C433 R434 C441 R438 SWD 5V Q414 ES
DRUM FF IN From SERVO
C437,C436 L412,L413 R436 SP REC FM LEVEL Q405 REC AMP
DL401 L418 PB 5V L409 L419 C446 C431 C430 CR
IC403 REC:ON DE-EMPHASIS CTL D409,D410 C442,C443,L415 NLN DE-EMP CTL D408
D424 PB 5V Q412 ES E-E5V Q410 ES Q411 ES LP 5V Q413 ES D404 D402
From 03 V/M/S MECHACON LP
SWD 5V CN402 SWD 5V From 03 V/M/S MECHACON R428 PTH 401 PB
CN410 SWD 5V R471 Q402 ES Q409 ES D423 From 03 V/M/S MECHACON REC
IC401 TP406 C419,C418 L403,L404 Q406 Q407 Q408 VIDEO AMP R416 FREQ RESPONSE
SWD 5V R402 AGC DET MUTE EQ TP402 CN401 BUFFER CH1 BUFFER CH1 BUFFER CH2 BUFFER CH2 C410 C413 CH1 VIDEO HEAD CH2
E-E 5V R470 R406 Q403 ES Q401 ES D401 PRE AMP CH2 PRE AMP CH1 R404 R405 CH2 CH1 DRUM FF
From 03 V/M/S MECHACON REC START
IC101 (COLOUR)
BPF101 ACC VCA BURST EMP BURST DE-EMP REC MAIN CONV REC KILLER AMP LCF101 R110 REC COLOUR LEVEL R464 Q404 ES LP 5V
REC PB ACC DET REC PB
DRUM FF SWD 5V R121 C112 C113 C115 Q105 ES Q106 ES R123 C119 C120 Q104 ES D110 D111 SYNC
1/2H PULSE KILLER REC AFC DET REC PB 160 Fh VCO 1/4 COUNT DOWN 4 PHASE SHIFT SUB CONV
XB101 SWD 5V SP/EP LP
PB AFC DET BURST GATE PULSE GEN REC APC DET VXO 4.43 MHz R117 VXO SWD 5V X101 TP106 C109
C117 DL101 MESECAM P2 P1 APC SW PB KILLER AMP COLOUR DET PB APC DET EF
To 03 V/M/S SERVO FSC OUT
E-E 5V D108 D107 D106 SYNC Q112 SYNC AMP L111 1/2 Fh TUNING Q111 AMP
IC102 SECAM DETECTOR RECTIFIER R147, C134 4.5 MHz FILTER CF101 R148 (E/EG ONLY) SECAM DETECTOR
Q109,Q110 AMP ID AMP PB MAIN CONV
R127 C125 TP104 Q101,Q102 AMP LPF101
C124 R124 To IC402-33pin DRUM FF From 03 V/M/S SERVO DRUM FF IN Q103 ES D102 DRUM FF
C122 SWD 5V R130 R131 R122 APC NON SW APC FILTER L106 C121,C123 D104 E-E 5V C107 D101 D105
APC SW CTL MESECAM H P2 M P1 L
From 03 V/M/S MECHACON VP ON
1 2 3 4 5 6
A B C D E F G H

APC SW CTL	
MESECAM	H
P2	M
P1	L

3.6 DRUM SERVO BLOCK DIAGRAM

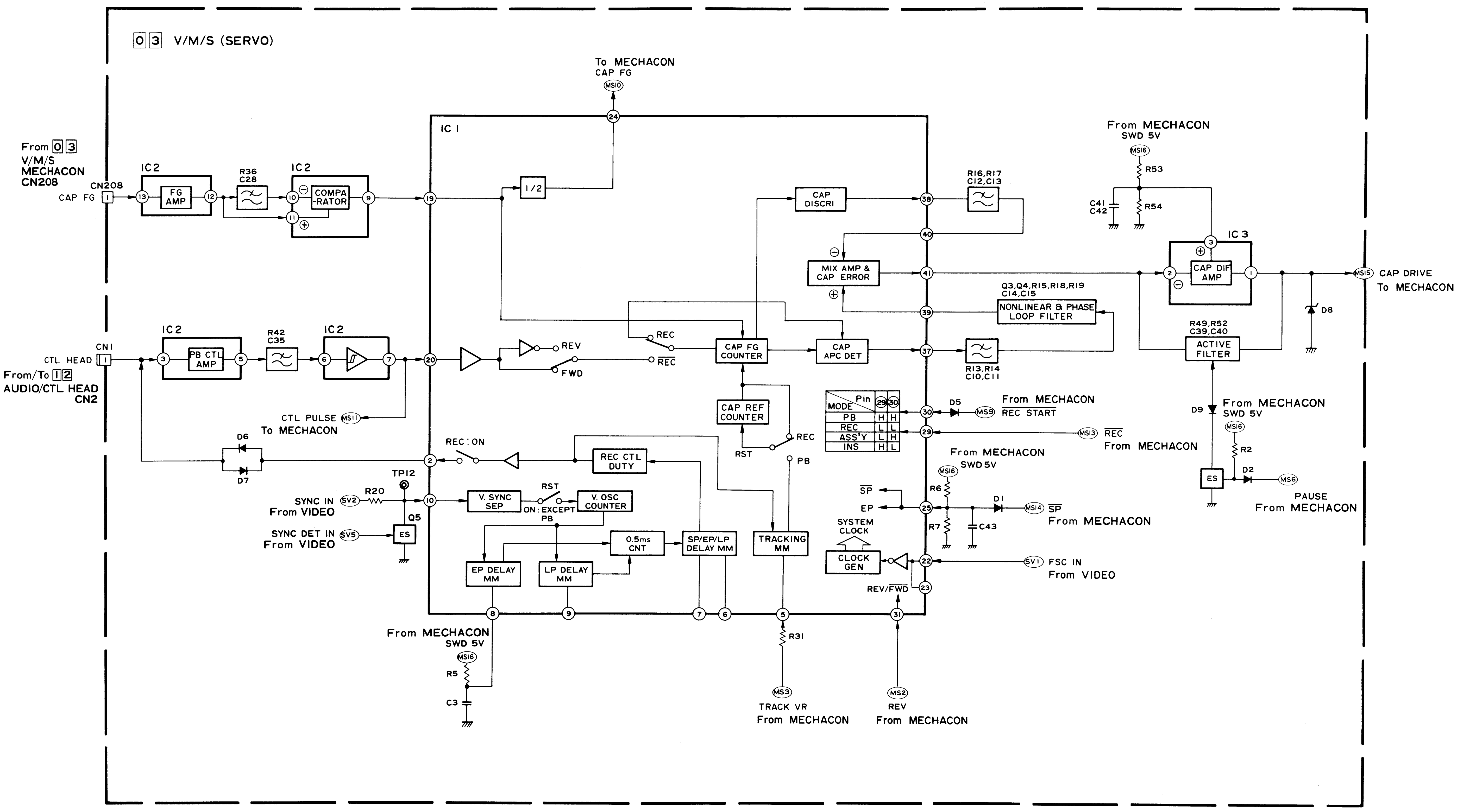


03 V/M/S (SERVO)
From VIDEO FSC IN
SV1
C1
From MECHACON SEARCH
MS7
From MECHACON REC START
MS9
D5
From MECHACON REC
MS13
R45,R46 C37
ACTIVE FILTER
DRUM FG/PG
CN 2
From 58 DRUM MOTOR CN1
DRUM FG SEP
DRUM DISCRI
R9,R10 C5,C6
IC 3
VF
DRUM DIF AMP
CN 2
V CTL
To 58 DRUM MOTOR CN1
D10
IC 3
CLOCK GEN
SYSTEM CLOCK
IC 1
TP 12
R20
SYNC IN
SV2
From VIDEO
V. SYNC SEP
RST
ON : EXCEPT PB
V. OSC COUNTER
DRUM APC DET
R11,R12 C7,C8
Q1,Q2,R3,R4 R22,C16,C17
NONLINEAR & PHASE LOOP FILTER
Q5
SV5
ES
SYNC DET IN From VIDEO
TP11
MS12
DRUM FF To MECHACON
SV3
DRUM FF To VIDEO
MS21
FMA FF To AUDIO via MECHACON
FF REF COUNTER
DRUM PG SEP
SW PHASE MM
50Hz FF
ASB & VPON
VP MM
REC DUTY COUNTER V PULSE CTL
PB & VPON
SV4
V. PULSE OUT To VIDEO
From MECHACON SWD 5V
MS16
R26
R27 SW POS.
C15
REV/FWD
MS2
REV
From MECHACON
From MECHACON
SWD 5V
MS16
R28
R29 V. LOCK
C16
MS8
V PULSE ON From MECHACON
R2
MS18
SW 5V-2 From MECHACON
D3
R21
R1
Q6
ES
D2
MS6
PAUSE From MECHACON

Pin / Mode	29	30
PB	H	H
REC	L	L
ASS'Y	L	H
INS	H	L

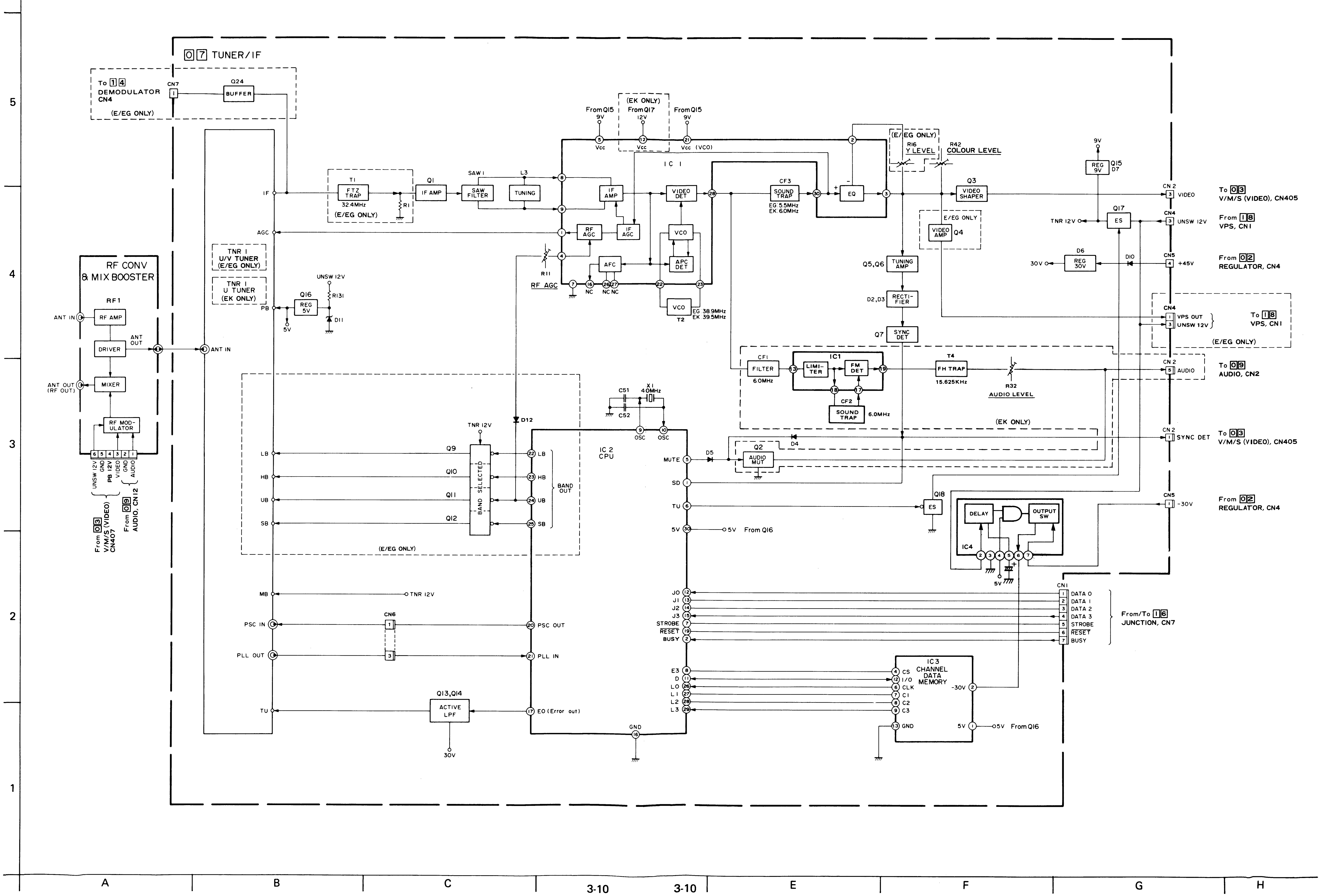
Pin / Mode	32	33
X 1	L	L
X 9	H	H

3.7 CAPSTAN SERVO BLOCK DIAGRAM


03 V/M/S (SERVO)
To MECHACON
CAP FG
MS10
24
IC 1
From 03 V/M/S MECHACON CN208
CN208
CAP FG
1
IC2
13
FG AMP
12
R36 C28
IC2
10
11
COMPA-RATOR
9
19
1/2
CAP DISCRI
38
R16,R17 C12,C13
40
MIX AMP & CAP ERROR
41
39
Q3,Q4,R15,R18,R19 C14,C15
NONLINEAR & PHASE LOOP FILTER
From MECHACON SWD 5V
MS16
R53
C41 C42
R54
IC 3
3
2
CAP DIF AMP
1
MS15
CAP DRIVE To MECHACON
D8
R49,R52 C39,C40
ACTIVE FILTER
CN1
CTL HEAD
From/To 12 AUDIO/CTL HEAD CN2
IC2
3
PB CTL AMP
5
R42 C35
IC2
6
7
20
REV
FWD
REC
REC
CAP FG COUNTER
CAP APC DET
37
R13,R14 C10,C11
CTL PULSE
MS11
To MECHACON
D6
D7
REC : ON
2
REC CTL DUTY
CAP REF COUNTER
RST
REC
PB
D5
MS9
From MECHACON
REC START
30
29
MS13
REC
From MECHACON
D9
From MECHACON SWD 5V
MS16
R2
D2
ES
MS6
PAUSE From MECHACON
TP12
SYNC IN From VIDEO
SV2
R20
10
Q5
SYNC DET IN From VIDEO
SV5
ES
V. SYNC SEP
RST
ON : EXCEPT PB
V. OSC COUNTER
0.5ms CNT
SP/EP/LP DELAY MM
TRACKING MM
EP DELAY MM
LP DELAY MM
From MECHACON SWD 5V
MS16
R6
SP
EP
25
D1
MS14
SP From MECHACON
R7
C43
SYSTEM CLOCK
CLOCK GEN
22
SV1
FSC IN From VIDEO
REV/FWD
23
8
9
7
6
5
31
From MECHACON SWD 5V
MS16
R5
C3
R31
MS3
TRACK VR From MECHACON
MS2
REV From MECHACON

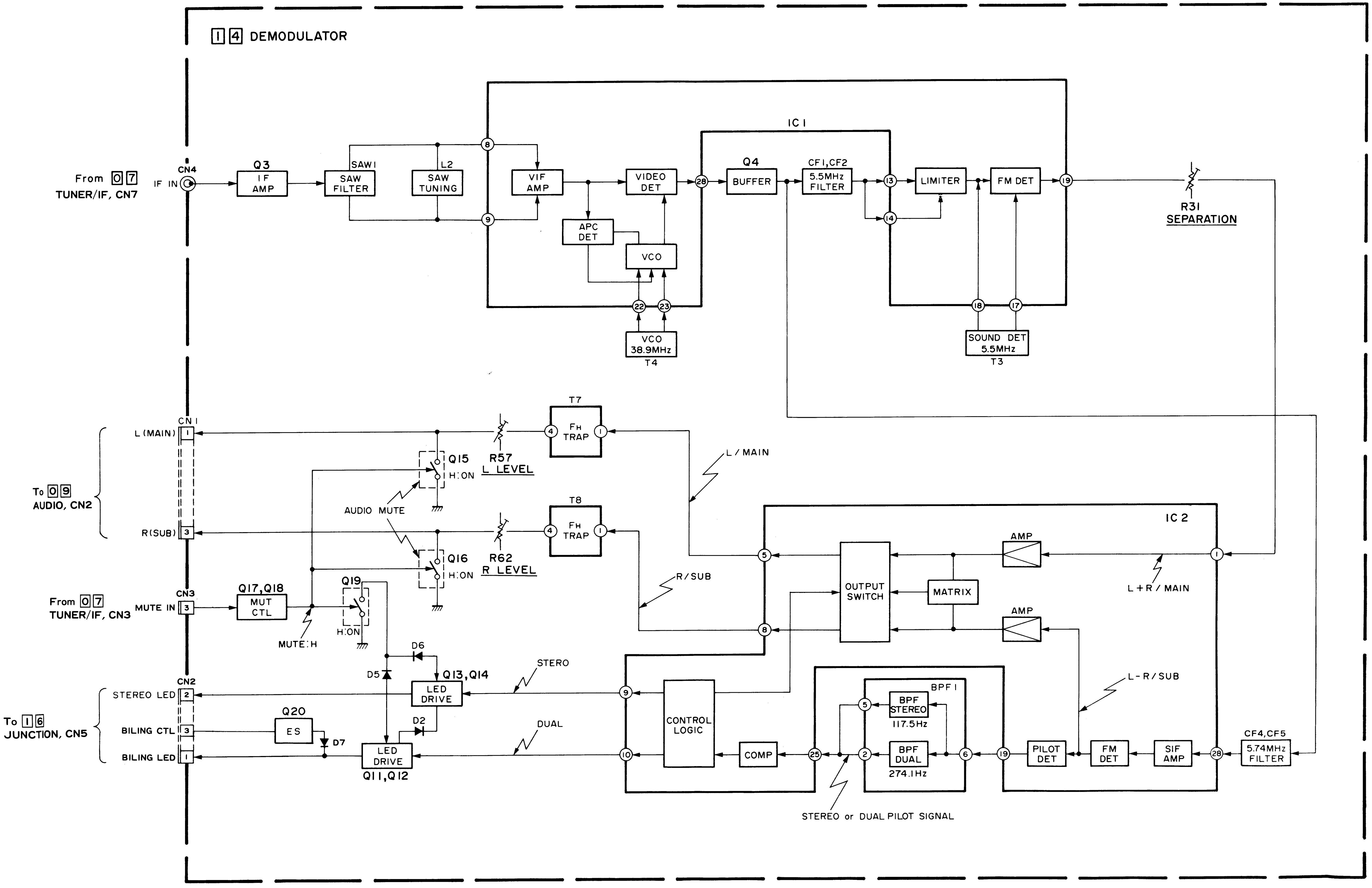
MODE \ Pin	29	30
PB	H	H
REC	L	L
ASS'Y	L	H
INS	H	L

3.8 TUNER/IF BLOCK DIAGRAM



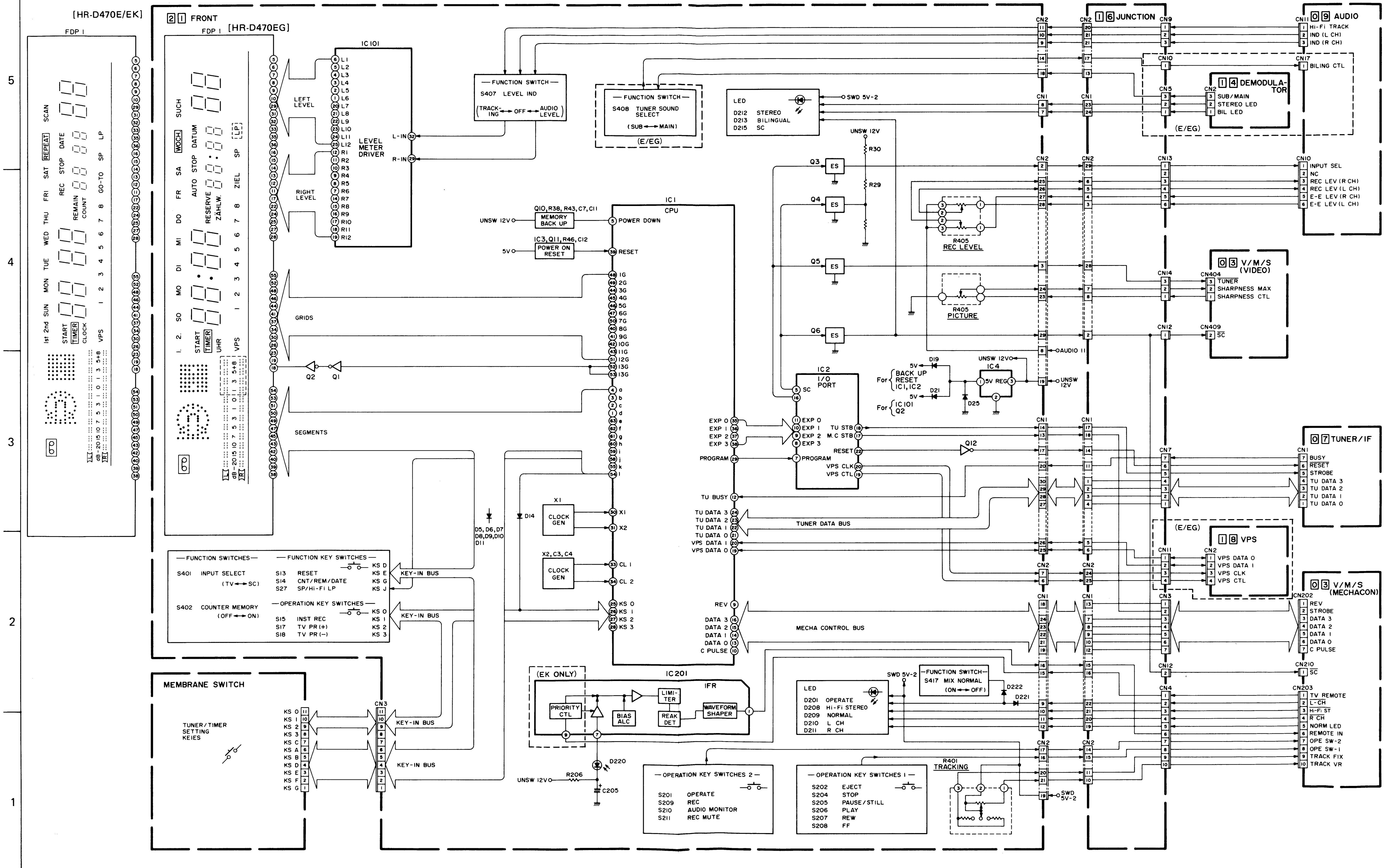
6
5
4
3
2
1
A
B
C
D
E
F
G
H
07 TUNER/IF
To 14 DEMODULATOR CN4
CN7
Q24
BUFFER
(E/EG ONLY)
RF CONV & MIX BOOSTER
RF1
ANT IN
RF AMP
DRIVER
ANT OUT
MIXER
ANT OUT (RF OUT)
RF MOD-ULATOR
UNSW 12V
GND
PB 12V
VIDEO
GND
AUDIO
From 03 V/M/S (VIDEO) CN407
From 09 AUDIO, CN12
ANT IN
TNR 1 U/V TUNER (E/EG ONLY)
TNR 1 U TUNER (EK ONLY)
IF
AGC
PB
Q16
REG 5V
5V
UNSW 12V
R131
D11
T1
FTZ TRAP
32.4MHz
R1
(E/EG ONLY)
Q1
IF AMP
SAW 1
SAW FILTER
L3
TUNING
From Q15 9V
(EK ONLY)
From Q17 12V
From Q15 9V
Vcc
Vcc
Vcc (VCO)
IC 1
IF AMP
RF AGC
IF AGC
VIDEO DET
VCO
AFC
APC DET
VCO
T2
EG 38.9MHz
EK 39.5MHz
R11
RF AGC
NC
NC NC
CF3
SOUND TRAP
EG 5.5MHz
EK 6.0MHz
EQ
(E/EG ONLY)
R16
Y LEVEL
R42
COLOUR LEVEL
Q3
VIDEO SHAPER
E/EG ONLY
VIDEO AMP
Q4
Q5,Q6
TUNING AMP
D2,D3
RECTI-FIER
Q7
SYNC DET
9V
REG 9V
Q15
D7
Q17
ES
TNR 12V
D6
REG 30V
30V
D10
CN 2
3 VIDEO
CN4
3 UNSW 12V
CN5
4 +45V
To 03 V/M/S (VIDEO), CN405
From 18 VPS, CN1
From 02 REGULATOR, CN4
CN4
1 VPS OUT
3 UNSW 12V
To 18 VPS, CN1
(E/EG ONLY)
CF1
FILTER
6.0MHz
IC1
LIMI-TER
FM DET
CF2
SOUND TRAP
6.0MHz
T4
FH TRAP
15.625KHz
R32
AUDIO LEVEL
(EK ONLY)
CN 2
5 AUDIO
To 09 AUDIO, CN2
CN 2
1 SYNC DET
To 03 V/M/S (VIDEO), CN405
C51
X1
4.0MHz
C52
OSC
OSC
IC 2
CPU
MUTE
D5
D4
Q2
AUDIO MUT
SD
TU
5V
5V From Q16
Q18
ES
CN5
1 -30V
From 02 REGULATOR, CN4
DELAY
OUTPUT SW
IC4
5V
D12
TNR 12V
LB
HB
UB
SB
Q9
Q10
Q11
Q12
BAND SELECTED
LB
HB
UB
SB
BAND OUT
(E/EG ONLY)
MB
TNR 12V
PSC IN
CN6
PSC OUT
PLL OUT
PLL IN
TU
Q13,Q14
ACTIVE LPF
30V
EO (Error out)
GND
J0
J1
J2
J3
STROBE
RESET
BUSY
CN1
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
RESET
BUSY
From/To 16 JUNCTION, CN7
E3
D
L0
L1
L2
L3
IC3
CHANNEL DATA MEMORY
CS
I/O
CLK
C1
C2
C3
GND
-30V
5V
5V From Q16

3.9 DEMODULATOR BLOCK DIAGRAM (HR-D470E/EG ONLY)



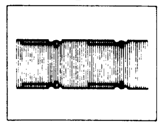
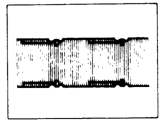
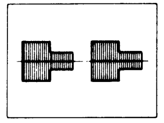
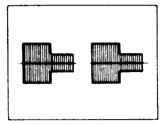
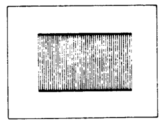
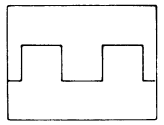
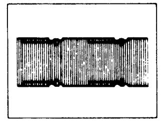
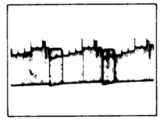
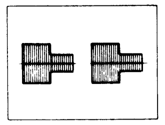
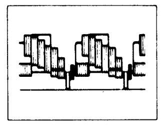
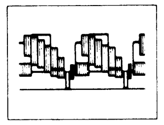
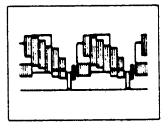
14 DEMODULATOR
From 07
TUNER/IF, CN7
IF IN
CN4
Q3
IF AMP
SAW1
SAW FILTER
L2
SAW TUNING
VIF AMP
VIDEO DET
APC DET
VCO
VCO 38.9MHz
T4
IC 1
Q4
BUFFER
CF1, CF2
5.5MHz FILTER
LIMITER
FM DET
SOUND DET 5.5MHz
T3
R31
SEPARATION
To 09
AUDIO, CN2
CN1
L (MAIN)
R (SUB)
T7
FH TRAP
R57
L LEVEL
Q15
H:ON
T8
FH TRAP
R62
R LEVEL
Q16
H:ON
AUDIO MUTE
L / MAIN
R / SUB
From 07
TUNER/IF, CN3
CN3
MUTE IN
Q17, Q18
MUT CTL
MUTE:H
Q19
H:ON
D6
D5
Q13, Q14
LED DRIVE
STERO
To 16
JUNCTION, CN5
CN2
STEREO LED
BILING CTL
BILING LED
Q20
ES
D7
D2
LED DRIVE
Q11, Q12
DUAL
IC 2
AMP
OUTPUT SWITCH
MATRIX
AMP
L + R / MAIN
L - R / SUB
CONTROL LOGIC
COMP
BPF 1
BPF STEREO
117.5Hz
BPF DUAL
274.1Hz
PILOT DET
FM DET
SIF AMP
CF4, CF5
5.74MHz FILTER
STEREO or DUAL PILOT SIGNAL

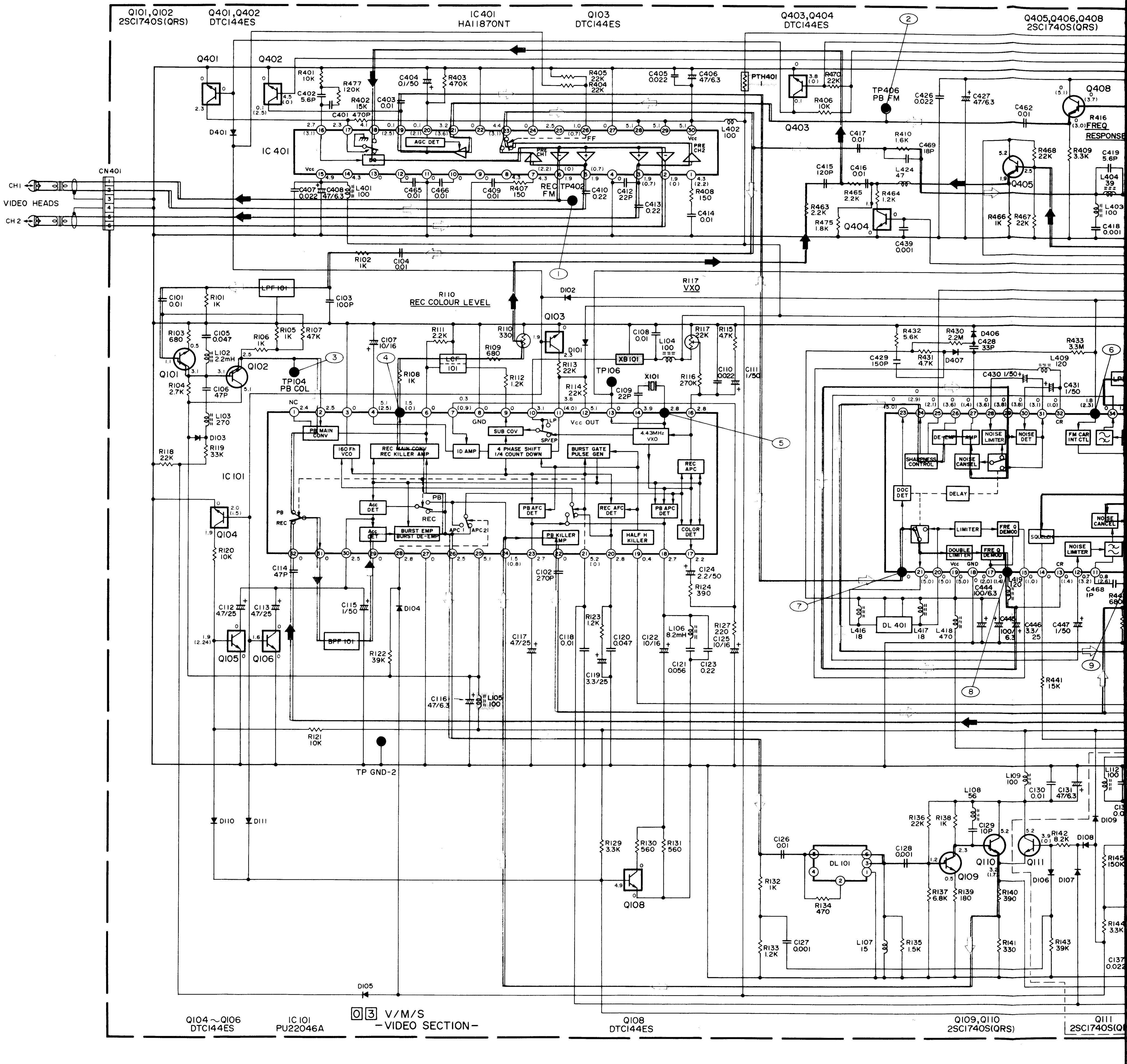
3.10 FRONT BLOCK DIAGRAM

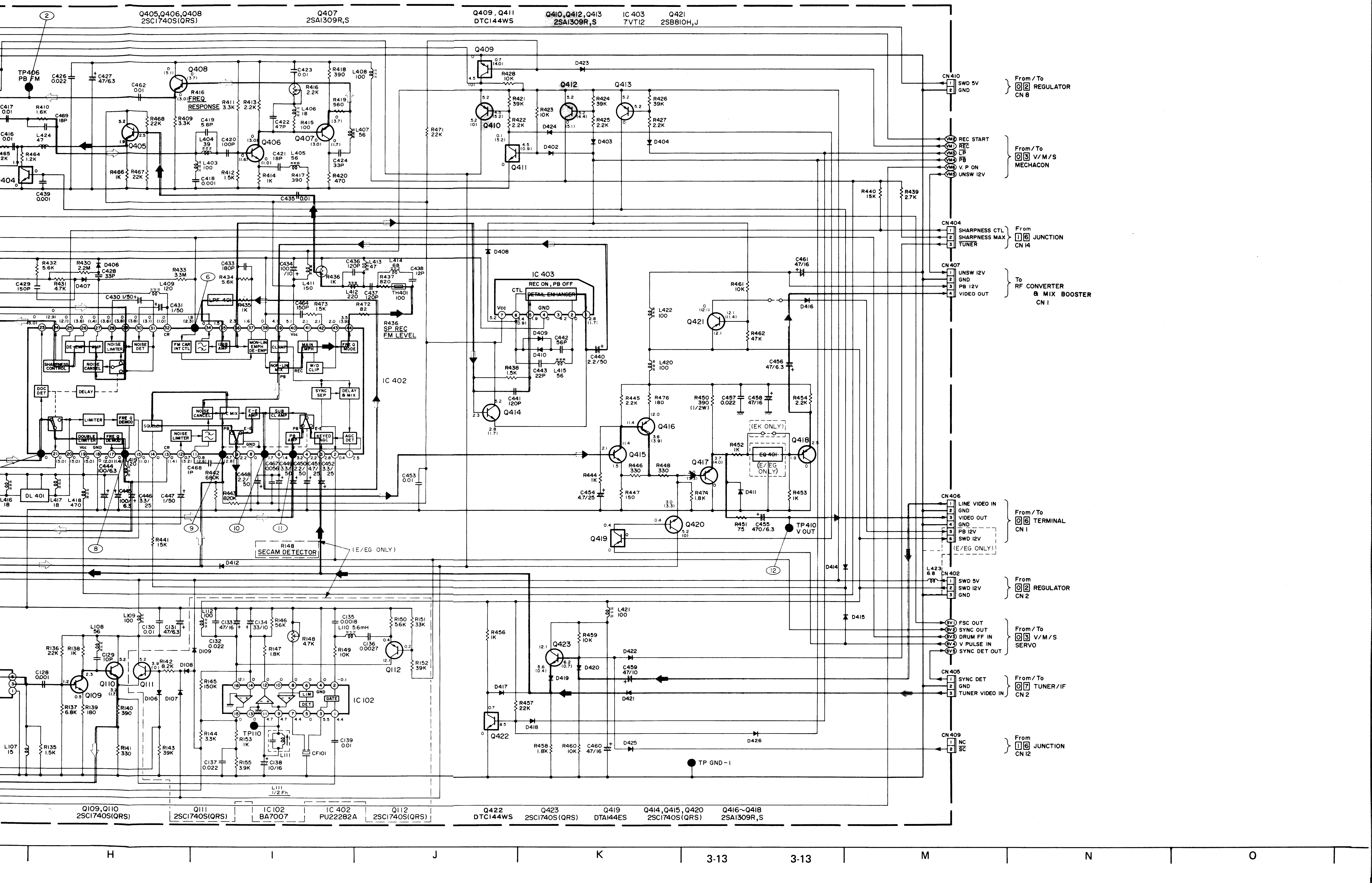

[HR-D470E/EK]
FDP 1
21 FRONT
FDP 1 [HR-D470EG]
SCAN
REPEAT
DATE
STOP
SAT
REC
FRI
REMAIN
COUNT
GO-TO
THU
WED
TUE
MON
SUN
1st 2nd
START
TIMER
CLOCK
VPS
SP
LP
SUCH
WOCH
DATUM
SA
STOP
AUTO
FR
RESERVE
ZÄHLW.
ZIEL
DO
MI
DI
MO
SO
UHR
dB -20 15 10 7 5 3 1 0 1 3 5+8
IC101
LEVEL METER DRIVER
LEFT LEVEL
RIGHT LEVEL
L-IN
R-IN
GRIDS
SEGMENTS
Q2
Q1
FUNCTION SWITCH
S407 LEVEL IND
TRACK-ING ← OFF → AUDIO LEVEL
FUNCTION SWITCH
S408 TUNER SOUND SELECT
(SUB ↔ MAIN)
(E/EG)
LED
D212 STEREO
D213 BILINGUAL
D215 SC
SWD 5V-2
IC1
CPU
Q10, R38, R43, C7, C11
MEMORY BACK UP
UNSW 12V
POWER DOWN
IC3, Q11, R46, C12
POWER ON RESET
5V
RESET
1G 2G 3G 4G 5G 6G 7G 8G 9G 10G 11G 12G 13G 13G
a b c d e f g h i j k l
D5, D6, D7, D8, D9, D10, D11
D14
X1
CLOCK GEN
X1
X2
X2, C3, C4
CLOCK GEN
CL 1
CL 2
KS 0
KS 1
KS 2
KS 3
FUNCTION SWITCHES
S401 INPUT SELECT (TV ↔ SC)
S402 COUNTER MEMORY (OFF ↔ ON)
FUNCTION KEY SWITCHES
S13 RESET
S14 CNT/REM/DATE
S27 SP/Hi-Fi LP
KS D
KS E
KS G
KS J
OPERATION KEY SWITCHES
S15 INST REC
S17 TV PR(+)
S18 TV PR(−)
KS 0
KS 1
KS 2
KS 3
KEY-IN BUS
KEY-IN BUS
MEMBRANE SWITCH
TUNER/TIMER SETTING KEIES
KS 0
KS 1
KS 2
KS 3
KS C
KS A
KS B
KS D
KS E
KS F
KS G
CN3
KEY-IN BUS
KEY-IN BUS
(EK ONLY)
IC201
IFR
PRIORITY CTL
BIAS ALC
LIMI-TER
REAK DET
WAVEFORM SHAPER
D220
R206
UNSW 12V
C205
Q3
Q4
Q5
Q6
ES
UNSW 12V
R30
R29
R405 REC LEVEL
R405 PICTURE
IC2
I/O PORT
SC
EXP 0
EXP 1
EXP 2
EXP 3
PROGRAM
TU STB
M.C STB
RESET
VPS CLK
VPS CTL
Q12
5V
D19
For BACK UP RESET IC1, IC2
D21
For IC101 Q2
D25
IC4
5V REG
UNSW 12V
AUDIO 11
UNSW 12V
TU BUSY
TU DATA 3
TU DATA 2
TU DATA 1
TU DATA 0
VPS DATA 1
VPS DATA 0
TUNER DATA BUS
REV
DATA 3
DATA 2
DATA 1
DATA 0
C PULSE
MECHA CONTROL BUS
LED
D201 OPERATE
D208 Hi-Fi STEREO
D209 NORMAL
D210 L CH
D211 R CH
SWD 5V-2
FUNCTION SWITCH
S417 MIX NORMAL (ON ↔ OFF)
D222
D221
OPERATION KEY SWITCHES 2
S201 OPERATE
S209 REC
S210 AUDIO MONITOR
S211 REC MUTE
OPERATION KEY SWITCHES 1
S202 EJECT
S204 STOP
S205 PAUSE/STILL
S206 PLAY
S207 REW
S208 FF
R401 TRACKING
SWD 5V-2
CN2
CN1
CN2
16 JUNCTION
CN9
CN10
CN5
CN13
CN14
CN12
CN7
CN11
CN3
CN12
CN4
09 AUDIO
CN11
Hi-Fi TRACK
IND (L CH)
IND (R CH)
CN17
BILING CTL
14 DEMODULA-TOR
CN2
SUB/MAIN
STEREO LED
BIL LED
(E/EG)
CN10
INPUT SEL
NC
REC LEV (R CH)
REC LEV (L CH)
E-E LEV (R CH)
E-E LEV (L CH)
03 V/M/S (VIDEO)
CN404
TUNER
SHARPNESS MAX
SHARPNESS CTL
CN409
SC
07 TUNER/IF
CN1
BUSY
RESET
STROBE
TU DATA 3
TU DATA 2
TU DATA 1
TU DATA 0
(E/EG)
18 VPS
CN2
VPS DATA 0
VPS DATA 1
VPS CLK
VPS CTL
03 V/M/S (MECHACON)
CN202
REV
STROBE
DATA 3
DATA 2
DATA 1
DATA 0
C PULSE
CN210
SC
CN203
TV REMOTE
L-CH
Hi-Fi ST
R CH
NORM LED
REMOTE IN
OPE SW-2
OPE SW-1
TRACK FIX
TRACK VR
A
B
C
D
E
F
G
H
1
2
3
4
5
6

3.11 VIDEO (V/M/S) SCHEMATIC DIAGRAM

– Waveforms of VIDEO CIRCUIT –

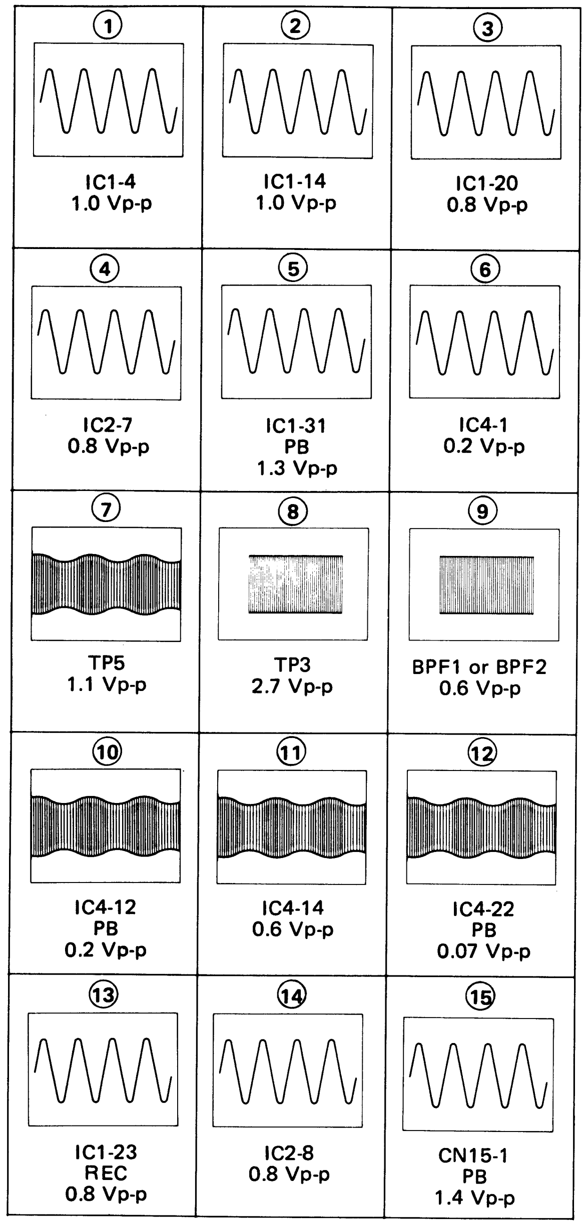
①  TP402 REC FM 1.7 Vp-p	②  TP406 PB 0.18 Vp-p	③  TP104 PB 0.26 Vp-p
④  IC101-5 REC 1 Vp-p	⑤  IC101-15 VXO 0.5 Vp-p	⑥  IC402-33 DRUM FF 4.0 Vp-p
⑦  IC402-22 PB 400 mVp-p	⑧  IC402-16 PB 0.55 Vp-p	⑨  IC402-10 PB 450 mVp-p
⑩  IC402-7 REC/PB 0.64 Vp-p	⑪  IC402-5 PB 0.25 Vp-p	⑫  TP410 VIDEO OUT 1.0 Vp-p

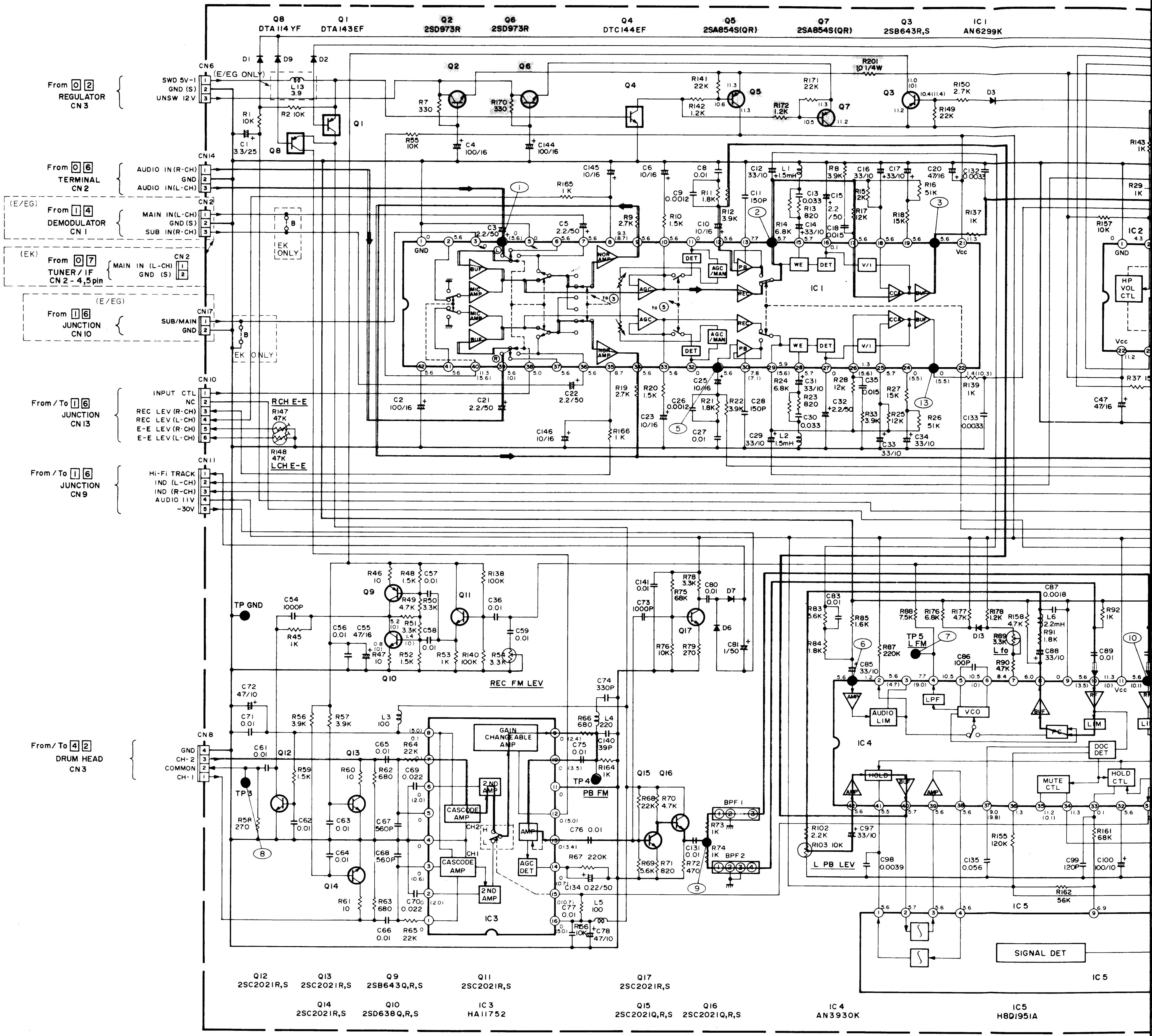

Q101,Q102 2SC1740S(QRS)
Q401,Q402 DTC144ES
IC401 HA11870NT
Q103 DTC144ES
Q403,Q404 DTC144ES
Q405,Q406,Q408 2SC1740S(QRS)
CN401
CH1
VIDEO HEADS
CH2
IC 401
AGC DET
TP402
REC FM
TP406
PB FM
R416 FREQ RESPONSE
R110 REC COLOUR LEVEL
R117 VXO
TP104 PB COL
TP106
LPF 101
LCF 101
XB101
X101
IC 101
PB MAIN CONV
160 fH VCO
REC MAIN CONV REC KILLER AMP
ID AMP
SUB COV
4 PHASE SHIFT 1/4 COUNT DOWN
BURST GATE PULSE GEN
4.43MHz VXO
REC APC
Acc DET
BURST EMP BURST DE-EMP
PB AFC DET
REC AFC DET
PB APC DET
PB KILLER AMP
HALF H KILLER
COLOR DET
BPF 101
SHARPNESS CONTROL
DOC DET
DELAY
NOISE LIMITER
NOISE DET
NOISE CANSEL
LIMITER
FREQ DEMOD
DOUBLE LIMITER
SQUELCH
NOISE CANCEL
FM CAR INT CTL
DL 401
DL 101
TP GND-2
Q104～Q106 DTC144ES
IC101 PU22046A
03 V/M/S -VIDEO SECTION-
Q108 DTC144ES
Q109,Q110 2SC1740S(QRS)
Q111 2SC1740S(Q
A
B
C
D
E
F
G
H
1
2
3
4
5
6

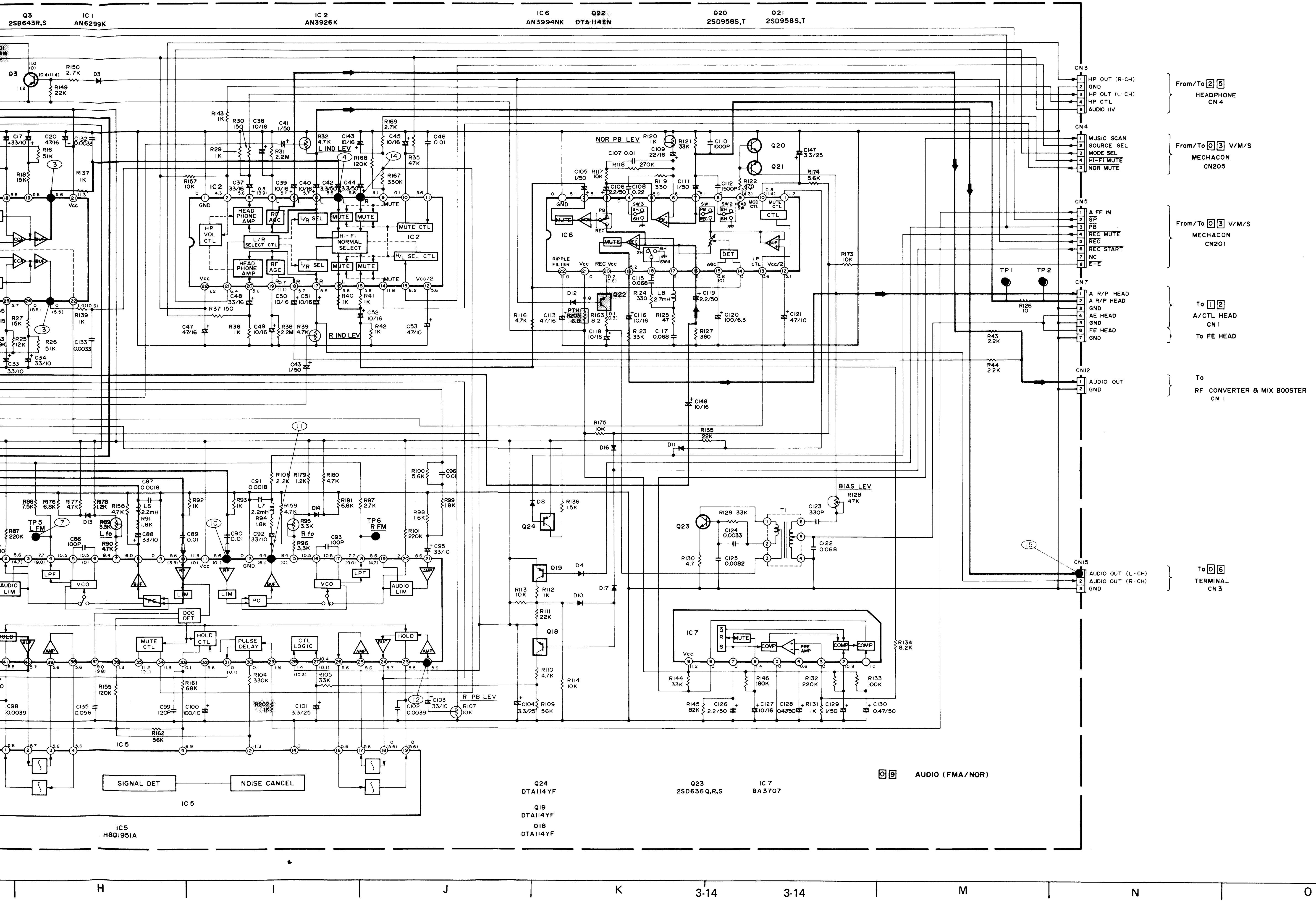

Q405,Q406,Q408
2SC1740S(QRS)
Q407
2SA1309R,S
Q409,Q411
DTC144WS
Q410,Q412,Q413
2SA1309R,S
IC 403
7VT12
Q421
2SB810H,J
TP406
PB FM
FREQ RESPONSE
IC 403
REC ON, PB OFF
DETAIL ENHANCER
IC 402
R436
SP REC
FM LEVEL
R148
SECAM DETECTOR
(E/EG ONLY)
(EK ONLY)
EQ 401
(E/EG ONLY)
TP410
V OUT
TP110
TP GND-1
IC 102
L111
1/2 Fh
CN410
SWD 5V
GND
From/To
02 REGULATOR
CN 8
REC START
REC
LP
PB
V. P ON
UNSW 12V
From/To
03 V/M/S
MECHACON
CN404
SHARPNESS CTL
SHARPNESS MAX
TUNER
From
16 JUNCTION
CN 14
CN407
UNSW 12V
GND
PB 12V
VIDEO OUT
To
RF CONVERTER
& MIX BOOSTER
CN 1
CN406
LINE VIDEO IN
GND
VIDEO OUT
GND
PB 12V
SWD 12V
From/To
06 TERMINAL
CN 1
(E/EG ONLY)
CN402
SWD 5V
SWD 12V
GND
From
02 REGULATOR
CN 2
FSC OUT
SYNC OUT
DRUM FF IN
V PULSE IN
SYNC DET OUT
From/To
03 V/M/S
SERVO
CN405
SYNC DET
GND
TUNER VIDEO IN
From/To
07 TUNER/IF
CN 2
CN409
NC
SC
From
16 JUNCTION
CN 12
Q109,Q110
2SC1740S(QRS)
Q111
2SC1740S(QRS)
IC 102
BA7007
IC 402
PU22282A
Q112
2SC1740S(QRS)
Q422
DTC144WS
Q423
2SC1740S(QRS)
Q419
DTA144ES
Q414,Q415,Q420
2SC1740S(QRS)
Q416~Q418
2SA1309R,S
H
I
J
K
M
N
O

3.12 AUDIO (FM/NOR) SCHEMATIC DIAGRAM

– Waveforms of AUDIO (FM/NOR) CIRCUIT –




Q8 DTA114YF
Q1 DTA143EF
Q2 2SD973R
Q6 2SD973R
Q4 DTC144EF
Q5 2SA854S(QR)
Q7 2SA854S(QR)
Q3 2SB643R,S
IC1 AN6299K
From 0 2 REGULATOR CN3
SWD 5V-1
GND (S)
UNSW 12V
CN6
(E/EG ONLY)
From 0 6 TERMINAL CN2
AUDIO IN (R-CH)
GND
AUDIO IN (L-CH)
CN14
(E/EG)
From 1 4 DEMODULATOR CN1
MAIN IN (L-CH)
GND (S)
SUB IN (R-CH)
CN2
(EK)
From 0 7 TUNER / IF CN2 - 4,5pin
MAIN IN (L-CH)
GND (S)
(E/EG)
From 1 6 JUNCTION CN10
SUB/MAIN
GND
CN17
EK ONLY
From / To 1 6 JUNCTION CN13
INPUT CTL
NC
REC LEV (R-CH)
REC LEV (L-CH)
E-E LEV (R-CH)
E-E LEV (L-CH)
CN10
RCH E-E
R147 47K
R148 47K
LCH E-E
From / To 1 6 JUNCTION CN9
Hi-Fi TRACK
IND (L-CH)
IND (R-CH)
AUDIO 11V
-30V
CN11
TP GND
REC FM LEV
From / To 4 2 DRUM HEAD CN3
GND
CH-2
COMMON
CH-1
CN8
TP3
GAIN CHANGEABLE AMP
CASCODE AMP
2ND AMP
AGC DET
IC3
TP4
PB FM
BPF1
BPF2
TP5
L FM
L fo
AUDIO LIM
LPF
VCO
IC4
DOC DET
HOLD
MUTE CTL
HOLD CTL
L PB LEV
SIGNAL DET
IC5
IC2
HP VOL CTL
Q12 2SC2021R,S
Q13 2SC2021R,S
Q9 2SB643Q,R,S
Q11 2SC2021R,S
Q17 2SC2021R,S
Q14 2SC2021R,S
Q10 2SD638Q,R,S
IC3 HA11752
Q15 2SC2021Q,R,S
Q16 2SC2021Q,R,S
IC4 AN3930K
IC5 H8D1951A
6
5
4
3
2
1
A
B
C
E
F
G
H

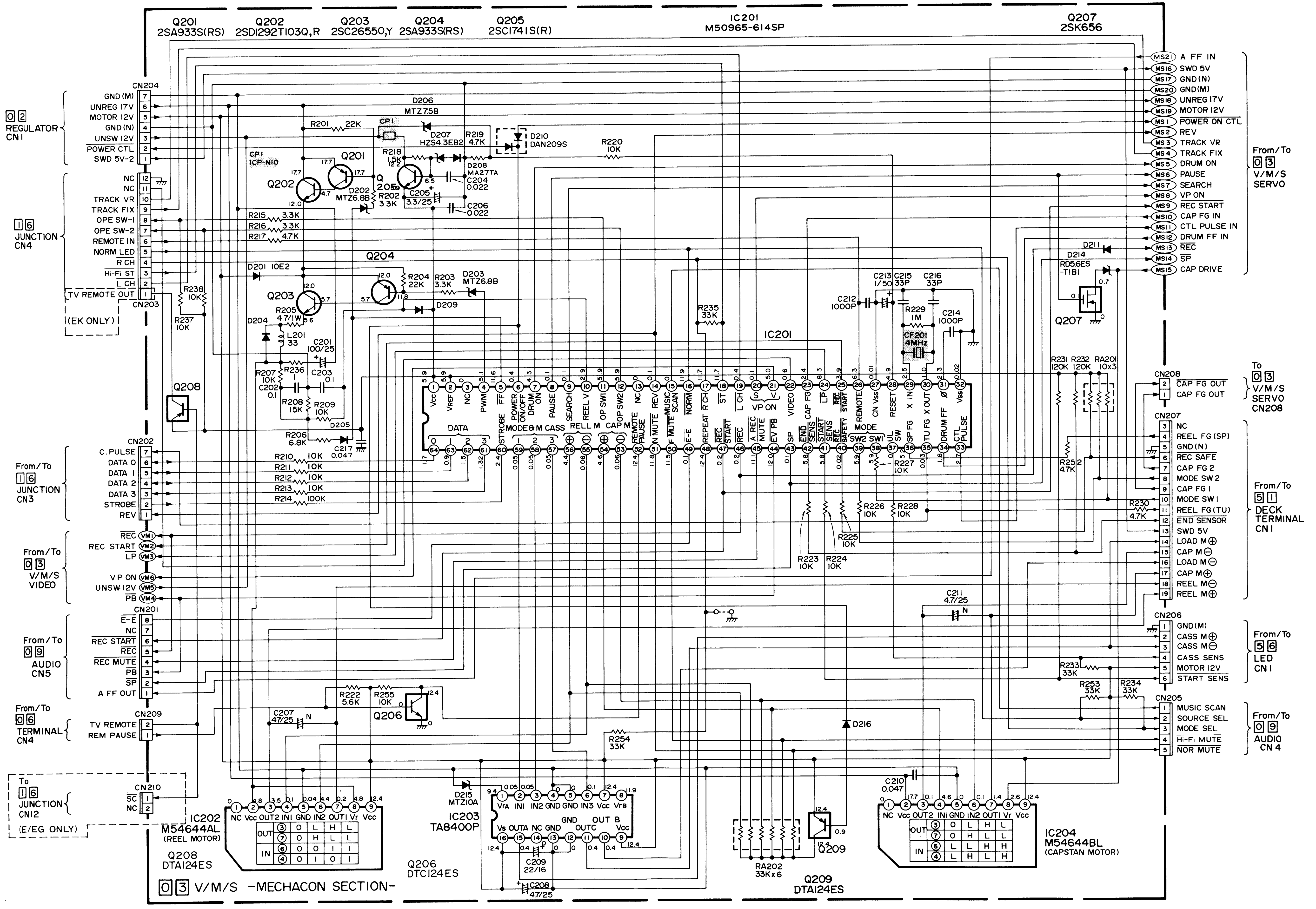


Q3
2SB643R,S
IC1
AN6299K
IC2
AN3926K
IC6
AN3994NK
Q22
DTA114EN
Q20
2SD958S,T
Q21
2SD958S,T
CN3
HP OUT (R-CH)
GND
HP OUT (L-CH)
HP CTL
AUDIO 11V
From/To 2 5
HEADPHONE
CN4
CN4
MUSIC SCAN
SOURCE SEL
MODE SEL
HI-FI MUTE
NOR MUTE
From/To 0 3 V/M/S
MECHACON
CN205
CN5
A FF IN
SP
PB
REC MUTE
REC
REC START
NC
E-E
From/To 0 3 V/M/S
MECHACON
CN201
TP1
TP2
CN7
A R/P HEAD
A R/P HEAD
GND
AE HEAD
GND
FE HEAD
GND
To 1 2
A/CTL HEAD
CN1
To FE HEAD
CN12
AUDIO OUT
GND
To
RF CONVERTER & MIX BOOSTER
CN1
CN15
AUDIO OUT (L-CH)
AUDIO OUT (R-CH)
GND
To 0 6
TERMINAL
CN3
L IND LEV
R IND LEV
NOR PB LEV
BIAS LEV
R PB LEV
HEAD PHONE AMP
HP VOL CTL
L/R SELECT CTL
RF AGC
L/R SEL
MUTE
Hi-Fi NORMAL SELECT
MUTE CTL
H/L SEL CTL
RIPPLE FILTER
REC Vcc
AGC
DET
LP CTL
Vcc/2
CTL
TP5 L FM
TP6 R FM
L fo
R fo
LPF
VCO
AUDIO LIM
PC
LIM
DOC DET
BUF
AMP
HOLD
MUTE CTL
HOLD CTL
PULSE DELAY
CTL LOGIC
SIGNAL DET
NOISE CANCEL
IC5
IC5
H8D1951A
IC7
PRE AMP
COMP
T1
Q23
Q24
Q19
Q18
Q24
DTA114YF
Q19
DTA114YF
Q18
DTA114YF
Q23
2SD636Q,R,S
IC7
BA3707
H
I
J
K
M
N
O

0 9 AUDIO (FMA/NOR)

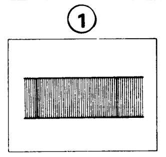
3.13 MECHACON (V/M/S) SCHEMATIC DIAGRAM

NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.

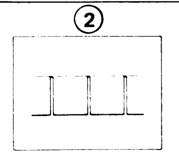

Q201 2SA933S(RS)
Q202 2SD1292T103Q,R
Q203 2SC2655O,Y
Q204 2SA933S(RS)
Q205 2SC1741S(R)
IC201 M50965-614SP
Q207 2SK656
CN204
GND (M)
UNREG 17V
MOTOR 12V
GND (N)
UNSW 12V
POWER CTL
SWD 5V-2
02 REGULATOR CN1
NC
TRACK VR
TRACK FIX
OPE SW-1
OPE SW-2
REMOTE IN
NORM LED
R CH
Hi-Fi ST
L CH
TV REMOTE OUT
(EK ONLY)
CN203
16 JUNCTION CN4
D206 MTZ7.5B
D207 HZS4.3EB2
D210 DAN209S
R220 10K
CP1 ICP-N10
R201 22K
R219 4.7K
R218 1.5K
D208 MA27TA
C204 0.022
C206 0.022
C205 3.3/25
D202 MTZ6.8B
R202 3.3K
R215 3.3K
R216 3.3K
R217 4.7K
D201 10E2
R238 10K
R237 10K
R204 22K
R203 3.3K
D203 MTZ6.8B
D209
R205 4.7/1W
D204
L201 33
C201 100/25
R207 10K
R236 1
C202 0.1
C203 0.1
R208 15K
R209 10K
D205
R206 6.8K
C217 0.047
Q208
CN202
C. PULSE
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
REV
From/To 16 JUNCTION CN3
R210 10K
R211 10K
R212 10K
R213 10K
R214 100K
REC START
LP
V.P ON
UNSW 12V
PB
From/To 03 V/M/S VIDEO
CN201
E-E
REC
REC MUTE
SP
A FF OUT
From/To 09 AUDIO CN5
CN209
TV REMOTE
REM PAUSE
From/To 06 TERMINAL CN4
To 16 JUNCTION CN12 (E/EG ONLY)
CN210
SC
R222 5.6K
R255 10K
Q206
C207 47/25
IC202 M54644AL (REEL MOTOR)
Q208 DTA124ES
Q206 DTC124ES
D215 MTZ10A
IC203 TA8400P
C209 22/16
C208 47/25
R254 33K
RA202 33Kx6
Q209 DTA124ES
D216
C210 0.047
IC204 M54644BL (CAPSTAN MOTOR)
C211 4.7/25
R235 33K
C212 1000P
C213 1/50
C215 33P
C216 33P
R229 1M
C214 1000P
CF201 4MHz
R231 120K
R232 120K
RA201 10Kx3
Vcc
VREF
PWM
FF
STROBE
POWER ON/OFF
DRUM ON
PAUSE
SEARCH
REEL V
OP SW1
OP SW2
REV
MUSIC SCAN
NORM
REPEAT
ST
VP ON
VIDEO
CAP FG
REC START
REMOTE
CN Vss
RESET
X IN
X OUT
Vss
DATA
MODE & M CASS
RELL M
CAP M
REMOTE PAUSE
N MUTE
F MUTE
E-E
REC START
A REC
MUTE
EV PB
END SENS
START SENS
SAFETY
MODE SW2 SW1
UL SW
SP FG
TU FG
DRUM FF
CTL PULSE
R227 10K
R226 10K
R228 10K
R225 10K
R223 10K
R224 10K
R252 4.7K
R230 4.7K
R233 33K
R253 33K
R234 33K
D211
D214 RD56ES-T1B1
Q207
A FF IN
SWD 5V
GND (N)
GND (M)
UNREG 17V
MOTOR 12V
POWER ON CTL
REV
TRACK VR
TRACK FIX
DRUM ON
PAUSE
SEARCH
VP ON
REC START
CAP FG IN
CTL PULSE IN
DRUM FF IN
REC
SP
CAP DRIVE
From/To 03 V/M/S SERVO
CN208
CAP FG OUT
To 03 V/M/S SERVO CN208
CN207
REEL FG (SP)
REC SAFE
CAP FG 2
MODE SW 2
CAP FG 1
MODE SW 1
REEL FG (TU)
END SENSOR
LOAD M⊕
CAP M⊖
LOAD M⊖
CAP M⊕
REEL M⊖
REEL M⊕
From/To 51 DECK TERMINAL CN1
CN206
CASS M⊕
CASS M⊖
CASS SENS
START SENS
From/To 56 LED CN1
CN205
MUSIC SCAN
SOURCE SEL
MODE SEL
Hi-Fi MUTE
NOR MUTE
From/To 09 AUDIO CN4
03 V/M/S -MECHACON SECTION-

3.14 SERVO (V/M/S) SCHEMATIC DIAGRAM

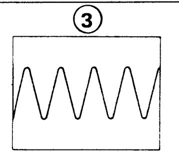
— Waveforms of SERVO CIRCUIT —



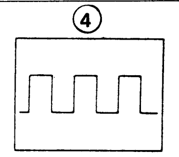
IC1-22
0.5 Vp-p



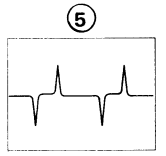
TP12
SYNC
5.0 Vp-p



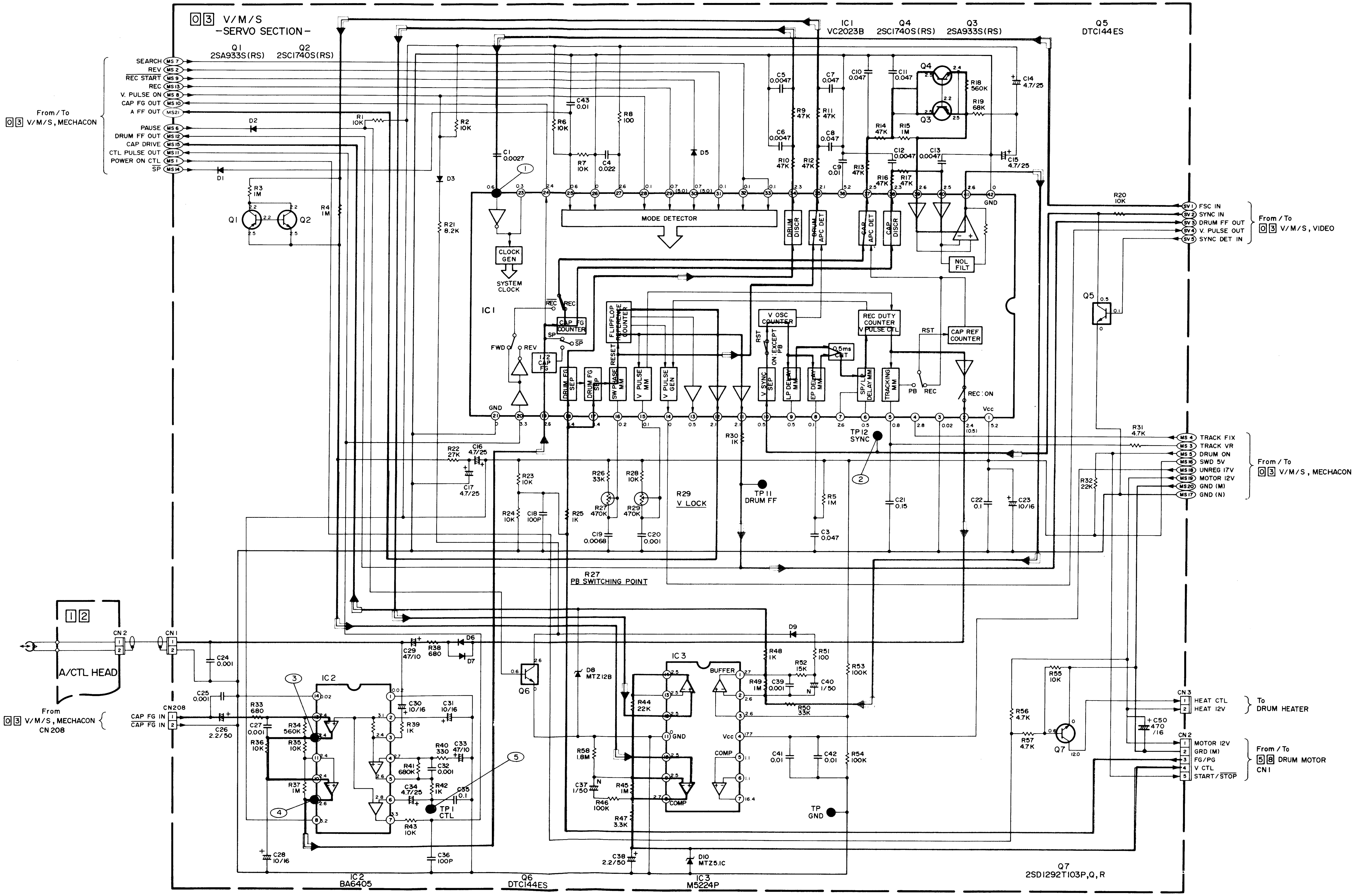
IC2-12
CAP FG
1.2 Vp-p



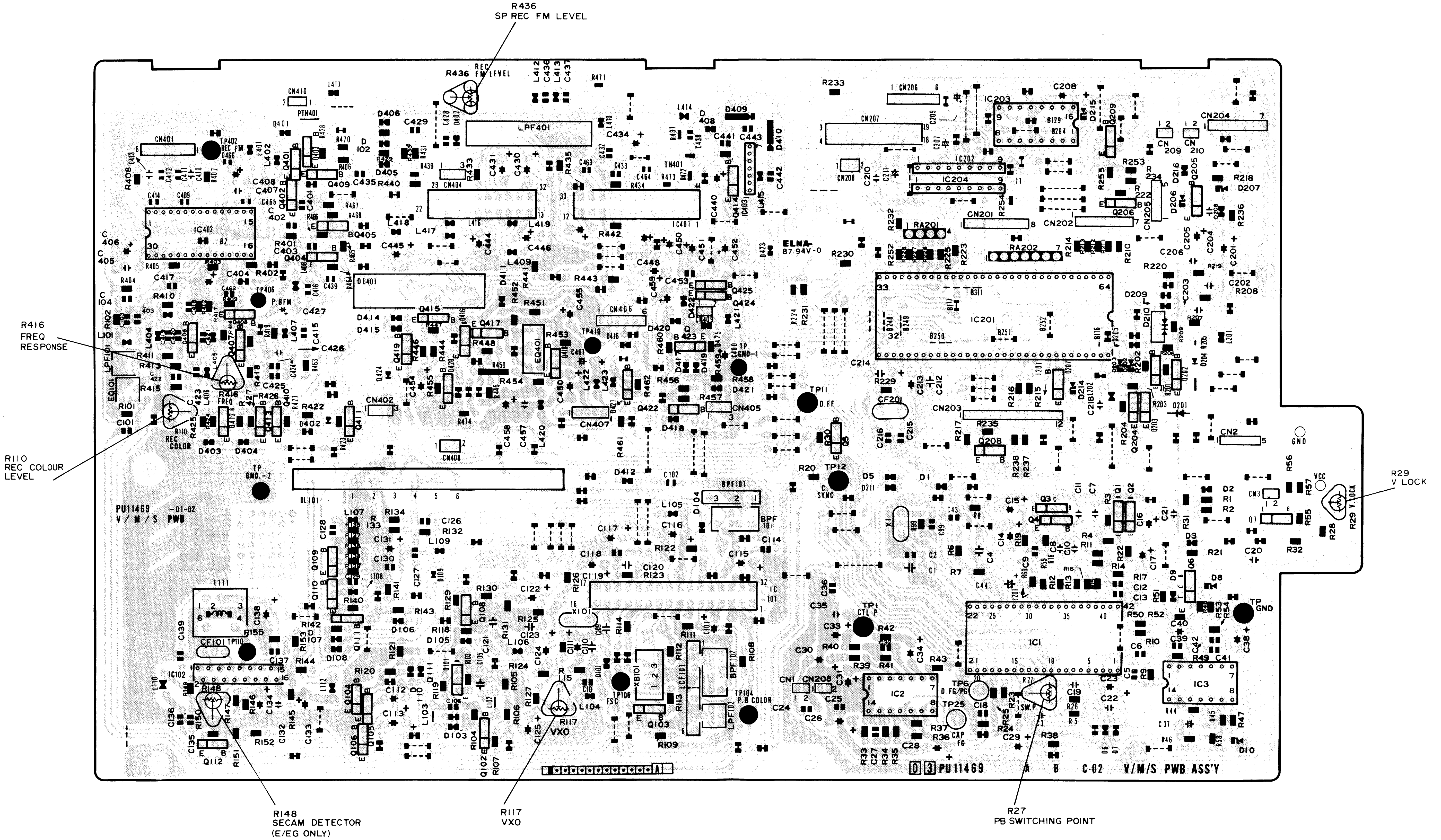
IC2-9
5 Vp-p (PB)



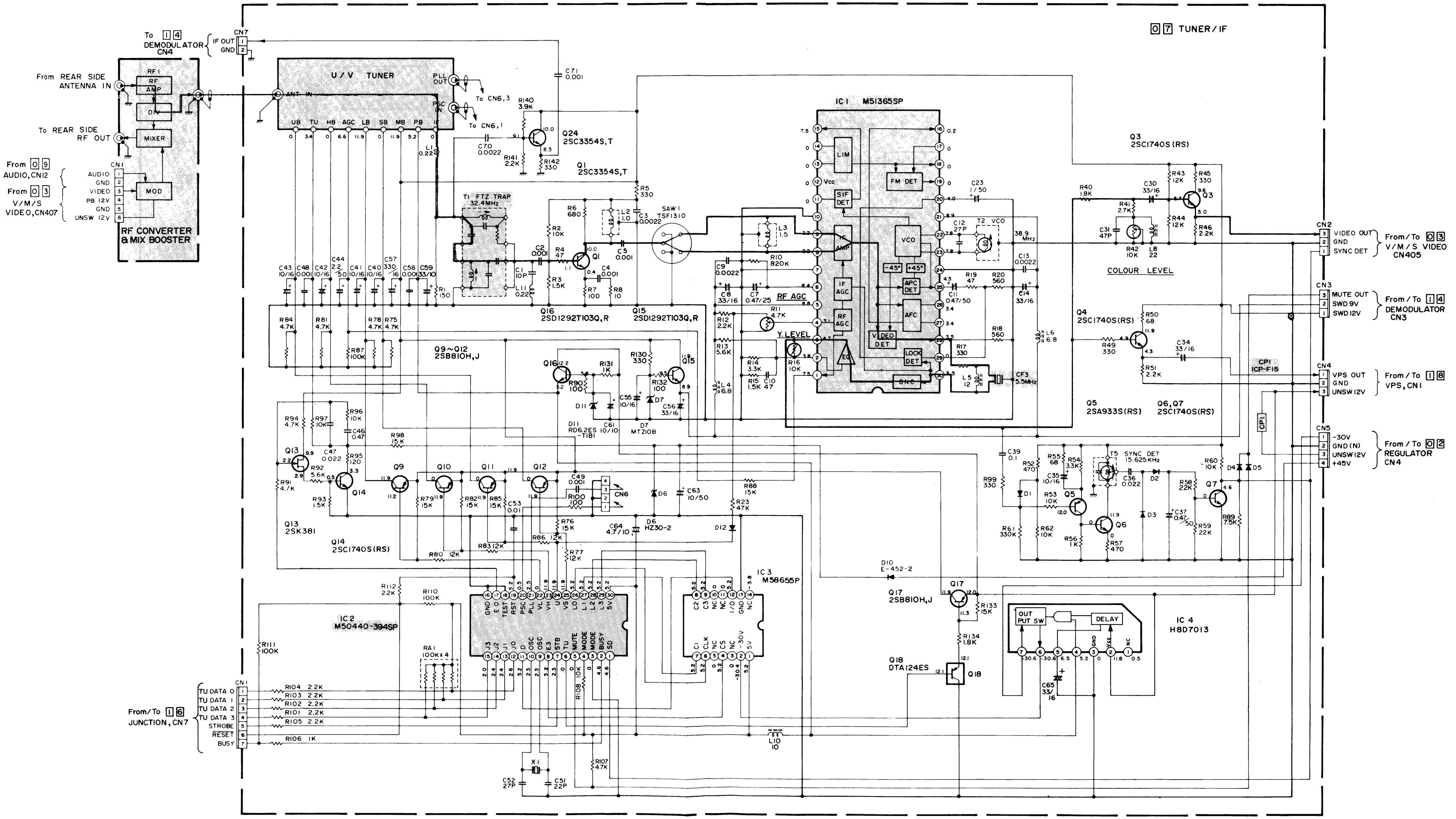
TP1
PB CTL
2.0 Vp-p


03 V/M/S
-SERVO SECTION-
Q1
2SA933S(RS)
Q2
2SC1740S(RS)
IC1
VC2023B
Q4
2SC1740S(RS)
Q3
2SA933S(RS)
Q5
DTC144ES
From / To
03 V/M/S, MECHACON
SEARCH MS 7
REV MS 2
REC START MS 9
REC MS 13
V. PULSE ON MS 8
CAP FG OUT MS 10
A FF OUT MS21
PAUSE MS 6
DRUM FF OUT MS 12
CAP DRIVE MS 15
CTL PULSE OUT MS 11
POWER ON CTL MS 1
SP MS 14
D1
D2
D3
D5
R1 10K
R2 10K
R3 1M
R4 1M
R6 10K
R7 10K
R8 100
R9 47K
R10 47K
R11 47K
R12 47K
R13 47K
R14 47K
R15 1M
R16 47K
R17 47K
R18 560K
R19 68K
R20 10K
R21 8.2K
C1 0.0027
C4 0.022
C5 0.0047
C6 0.0047
C7 0.047
C8 0.047
C9 0.01
C10 0.047
C11 0.047
C12 0.0047
C13 0.0047
C14 4.7/25
C15 4.7/25
C43 0.01
MODE DETECTOR
DRUM DISCR
DRUM APC DET
CAP APC DET
CAP DISCR
NOL FILT
CLOCK GEN
SYSTEM CLOCK
IC1
REC
REC
CAP FG COUNTER
SP
SP
FWD
REV
1/2 CAP FG
FLIPFLOP REFERENCE COUNTER
RESET
DRUM FG SEP
DRUM FG SEP
SW PHASE MM
V PULSE MM
V PULSE GEN
V OSC COUNTER
RST
ON: EXCEPT PB
V SYNC SEP
LP DELAY MM
EP DELAY MM
0.5ms CNT
REC DUTY COUNTER V PULSE CTL
SP/LP DELAY MM
TRACKING MM
CAP REF COUNTER
PB
REC
REC: ON
GND
Vcc
TP12 SYNC
From / To
03 V/M/S, VIDEO
SV1 FSC IN
SV2 SYNC IN
SV3 DRUM FF OUT
SV4 V. PULSE OUT
SV5 SYNC DET IN
R31 4.7K
R32 22K
From / To
03 V/M/S, MECHACON
MS 4 TRACK FIX
MS 3 TRACK VR
MS 5 DRUM ON
MS16 SWD 5V
MS18 UNREG 17V
MS19 MOTOR 12V
MS20 GND (M)
MS17 GND (N)
R22 27K
C16 4.7/25
C17 4.7/25
R23 10K
R24 10K
C18 100P
R25 1K
R26 33K
R27 470K
R28 10K
R29 470K
R29 V LOCK
C19 0.0068
C20 0.001
R30 1K
TP11 DRUM FF
R5 1M
C3 0.047
C21 0.15
C22 0.1
C23 10/16
R27 PB SWITCHING POINT
12
A/CTL HEAD
CN2
CN1
C24 0.001
C25 0.001
From
03 V/M/S, MECHACON
CN 208
CAP FG IN
CAP FG IN
CN208
C26 2.2/50
R33 680
C27 0.001
R34 560K
R35 10K
R36 10K
R37 1M
C28 10/16
IC2
C29 47/10
R38 680
D6
D7
C30 10/16
C31 10/16
R39 1K
R40 330
C33 47/10
R41 680K
C32 0.001
C34 4.7/25
R42 1K
C35 0.1
TP1 CTL
R43 10K
C36 100P
IC2
BA6405
Q6
DTC144ES
D8 MTZ12B
R58 1.8M
C37 1/50
R45 1M
R46 100K
R47 3.3K
C38 2.2/50
D10 MTZ5.1C
IC3
BUFFER
COMP
COMP
Vcc
GND
R44 22K
D9
R48 1K
R49 1M
C39 0.001
R51 100
R52 15K
C40 1/50
R50 33K
R53 100K
C41 0.01
C42 0.01
R54 100K
TP GND
IC3
M5224P
R55 10K
R56 4.7K
R57 4.7K
Q7
Q7
2SD1292T103P,Q,R
+C50 470 /16
CN3
1 HEAT CTL
2 HEAT 12V
To
DRUM HEATER
CN2
1 MOTOR 12V
2 GRD (M)
3 FG/PG
4 V CTL
5 START/STOP
From / To
58 DRUM MOTOR
CN1

3.15 VIDEO/MECHACON/SERVO CIRCUIT BOARD

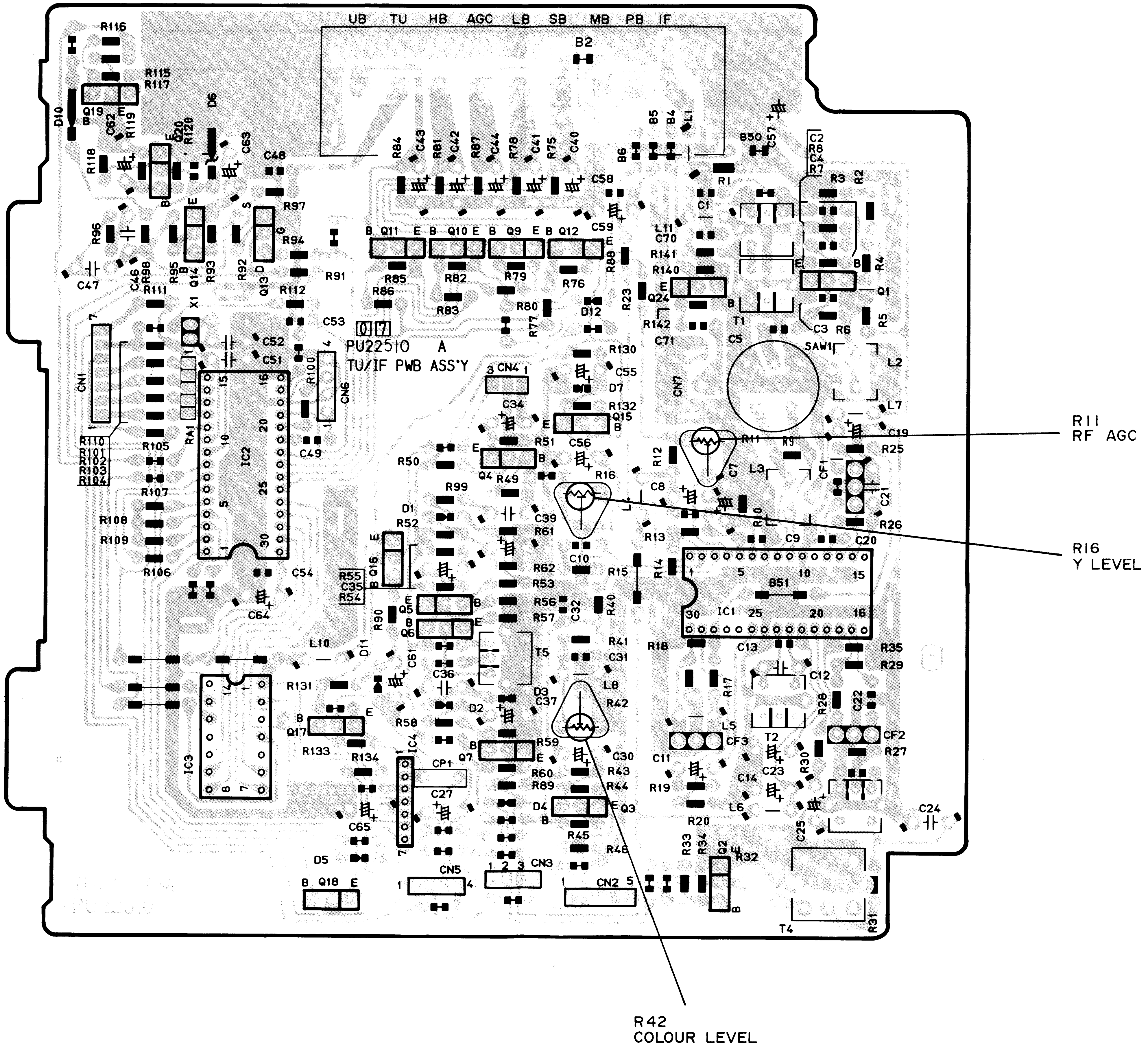

R436
SP REC FM LEVEL
R416
FREQ
RESPONSE
R110
REC COLOUR
LEVEL
R29
V LOCK
R148
SECAM DETECTOR
(E/EG ONLY)
R117
VXO
R27
PB SWITCHING POINT
PU11469 -01-02
V/M/S PWB
03 PU11469 A B C-02 V/M/S PWB ASS'Y
ELNA 87 94V-0
TP GND-2
TP GND
TP11 D.FF
TP12 C.SYNC
TP1 CTL P.
TP6 D.FG/PG
TP25 CAP FG
TP104 P.B COLOR
TP106 FSC
TP402 REC FM
TP406 P.BFM
TP410
TP110
TP GND-1
IC1
IC2
IC3
IC101
IC102
IC201
IC202
IC203
IC204
IC401
IC402
LPF401
DL401
DL101
BPF101
1
2
3
4
5
6
A
B
C
E
F
G
H

3.16 TUNER/IF SCHEMATIC DIAGRAM (HR-D470E/EG)


07 TUNER/IF
To 14 DEMODULATOR CN4
CN7
IF OUT
GND
From REAR SIDE ANTENNA IN
To REAR SIDE RF OUT
RF1
RF AMP
DIV
MIXER
MOD
RF CONVERTER & MIX BOOSTER
From 09 AUDIO, CN12
From 03 V/M/S VIDEO, CN407
CN1
AUDIO
GND
VIDEO
PB 12V
GND
UNSW 12V
U/V TUNER
ANT IN
PLL OUT
PSC IN
To CN6,3
To CN6,1
UB TU HB AGC LB SB MB PB IF
Q24 2SC3354S,T
Q1 2SC3354S,T
T1 FTZ TRAP 32.4MHz
SAW1 TSF1310
Q16 2SD1292T103Q,R
Q15 2SD1292T103Q,R
Q9~Q12 2SB810H,J
Q13 2SK381
Q14 2SC1740S(RS)
IC1 M51365SP
LIM
SIF DET
FM DET
IF AMP
IF AGC
RF AGC
VCO
APC DET
AFC
VIDEO DET
LOCK DET
SNC
EQ
T2 VCO
38.9 MHz
RF AGC
Y.LEVEL
CF3 5.5MHz
Q3 2SC1740S(RS)
COLOUR LEVEL
Q4 2SC1740S(RS)
Q5 2SA933S(RS)
Q6, Q7 2SC1740S(RS)
T5 SYNC DET 15.625KHz
CP1 ICP-F15
CN2
VIDEO OUT
GND
SYNC DET
From/To 03 V/M/S VIDEO CN405
CN3
MUTE OUT
SWD 9V
SWD 12V
From/To 14 DEMODULATOR CN3
CN4
VPS OUT
GND
UNSW12V
From/To 18 VPS, CN1
CN5
-30V
GND (N)
UNSW12V
+45V
From/To 02 REGULATOR CN4
D11 RD6.2ES -T1B1
D7 MTZ10B
D6 HZ30-2
D10 E-452-2
CN6
IC2 M50440-394SP
IC3 M58655P
IC4 H8D7013
OUT PUT SW
DELAY
Q17 2SB810H,J
Q18 DTA124ES
RA1 100K×4
X1
From/To 16 JUNCTION, CN7
TU DATA 0
TU DATA 1
TU DATA 2
TU DATA 3
STROBE
RESET
BUSY
L10 10

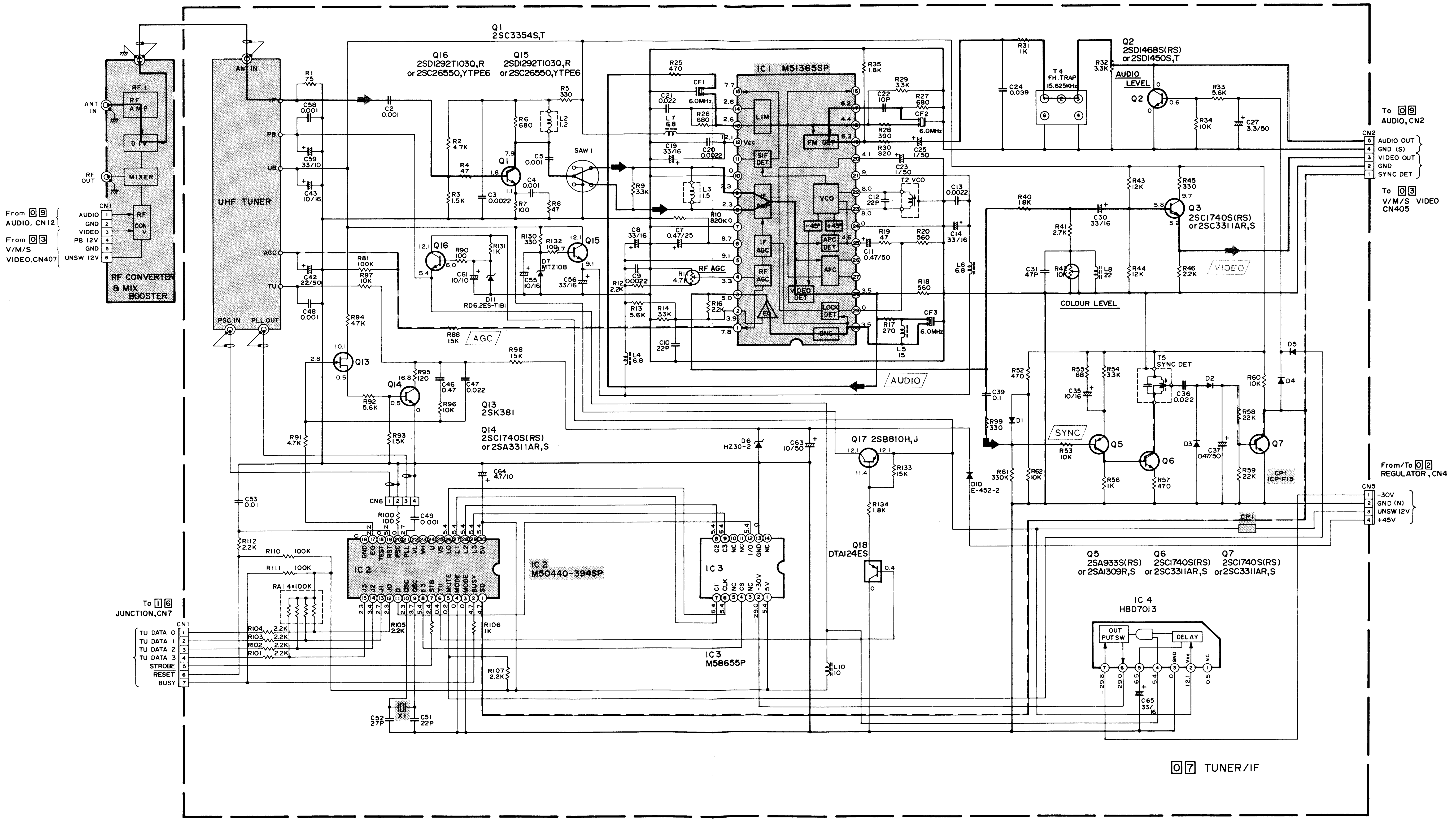
NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.

3.17 TUNER/IF CIRCUIT BOARD (HR-D470E/EG)


UB TU HB AGC LB SB MB PB IF
PU22510 A
TU/IF PWB ASS'Y
IC1
IC2
IC3
IC4
CN1
CN2
CN3
CN4
CN5
CN6
CN7
SAW1
R11
RF AGC
R16
Y LEVEL
R42
COLOUR LEVEL

6
5
4
3
2
1
A
B
C
E
F
G
H

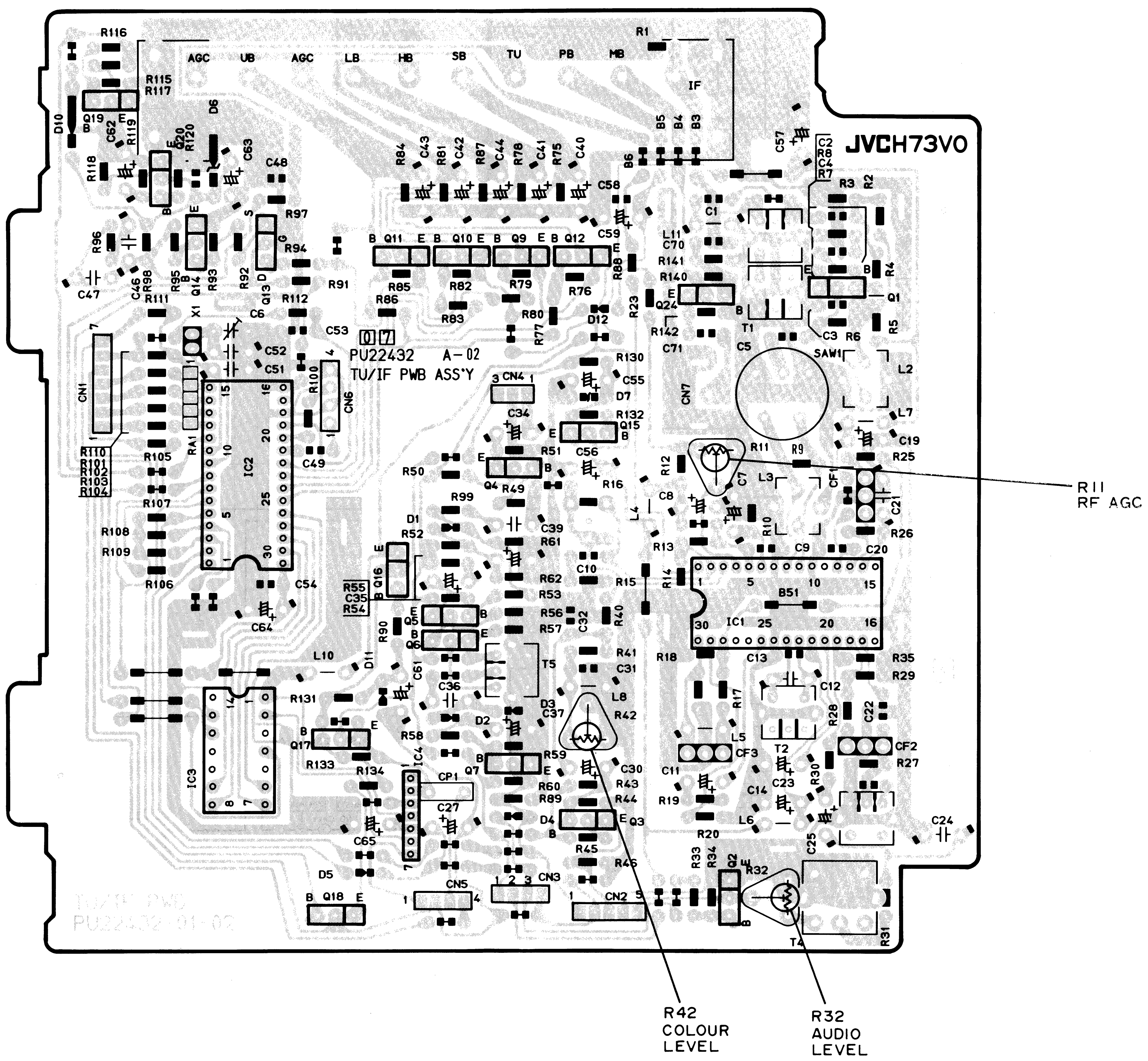
3.18 TUNER/IF SCHEMATIC DIAGRAM (HR-D470EK)



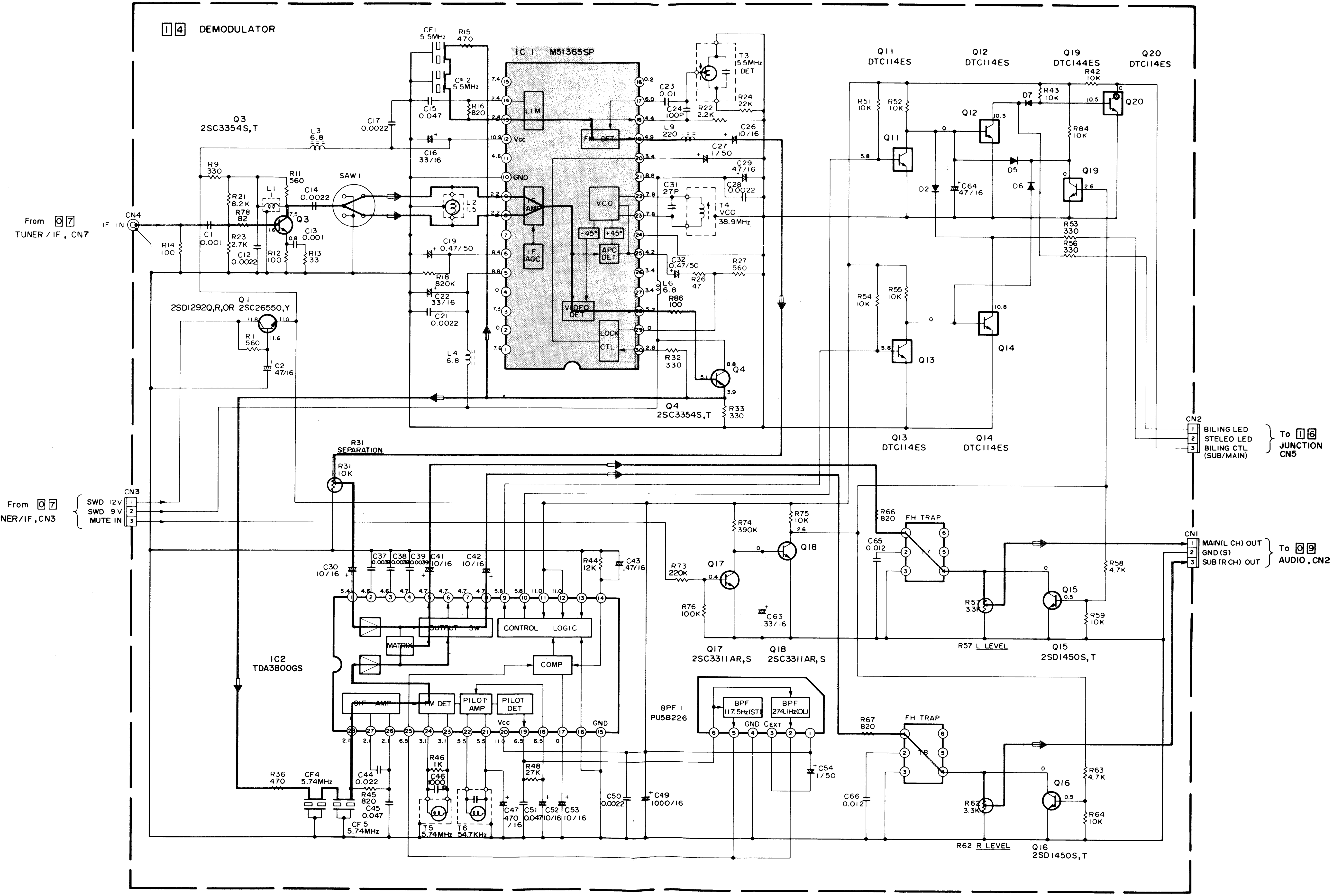
RF CONVERTER & MIX BOOSTER
RF 1
RF AMP
DIV
MIXER
RF CON-V
ANT IN
RF OUT
From 09 AUDIO, CN12
From 03 V/M/S VIDEO, CN407
CN1
AUDIO
GND
VIDEO
PB 12V
GND
UNSW 12V
UHF TUNER
ANT IN
IF
PB
UB
AGC
TU
PSC IN
PLL OUT
Q1 2SC3354S,T
Q16 2SD1292T103Q,R or 2SC26550,YTPE6
Q15 2SD1292T103Q,R or 2SC26550,YTPE6
SAW 1
IC1 M51365SP
LIM
SIF DET
IF AMP
IF AGC
RF AGC
EQ
FM DET
VCO
-45°
+45°
APC DET
AFC
VIDEO DET
LOCK DET
SNC
Vcc
CF1 6.0MHz
CF2 6.0MHz
CF3 6.0MHz
T2 VCO
RF AGC
AGC
AUDIO
D7 MTZ108
D11 RD6.2ES-TIB1
Q13 2SK381
Q14 2SC1740S(RS) or 2SA3311AR,S
Q17 2SB810H,J
Q18 DTA124ES
D6 HZ30-2
D10 E-452-2
Q2 2SD1468S(RS) or 2SD1450S,T
T4 FH. TRAP 15.625KHz
AUDIO LEVEL
Q3 2SC1740S(RS) or 2SC3311AR,S
VIDEO
COLOUR LEVEL
T5 SYNC DET
SYNC
CP1 ICP-F15
Q5 2SA933S(RS) or 2SA1309R,S
Q6 2SC1740S(RS) or 2SC3311AR,S
Q7 2SC1740S(RS) or 2SC3311AR,S
To 09 AUDIO, CN2
CN2
AUDIO OUT
GND (S)
VIDEO OUT
GND
SYNC DET
To 03 V/M/S VIDEO CN405
From/To 02 REGULATOR, CN4
CN5
-30V
GND (N)
UNSW 12V
+45V
IC2 M50440-394SP
IC3 M58655P
IC4 H8D7013
OUT PUT SW
DELAY
CN6
X1
RA1 4×100K
To 16 JUNCTION, CN7
CN1
TU DATA 0
TU DATA 1
TU DATA 2
TU DATA 3
STROBE
RESET
BUSY
07 TUNER/IF

NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.

3.19 TUNER/IF CIRCUIT BOARD (HR-D470EK)


JVCH73V0
PU22432 A-02
TU/IF PWB ASS'Y
TU/IF PWB
PU22432-01-02
AGC
UB
AGC
LB
HB
SB
TU
PB
MB
IF
IC1
IC2
IC3
IC4
CN1
CN2
CN3
CN4
CN5
CN6
CN7
SAW1
T1
T2
T4
T5
CF1
CF2
CF3
CP1
X1
R11
RF AGC
R42
COLOUR
LEVEL
R32
AUDIO
LEVEL
6
5
4
3
2
1
A
B
C
E
F
G
H

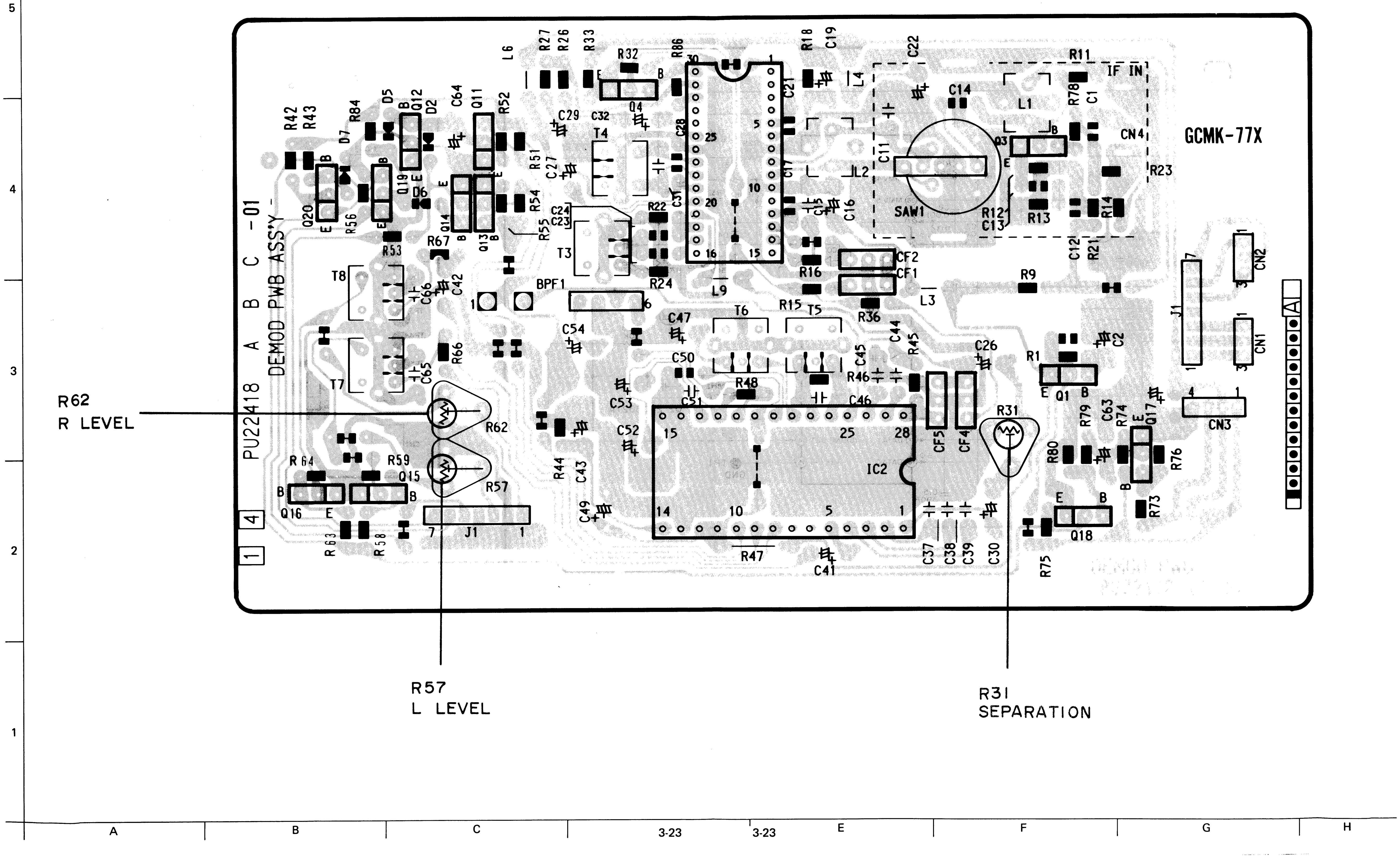
3.20 DEMODULATOR SCHEMATIC DIAGRAM (HR-D470E/EG ONLY)



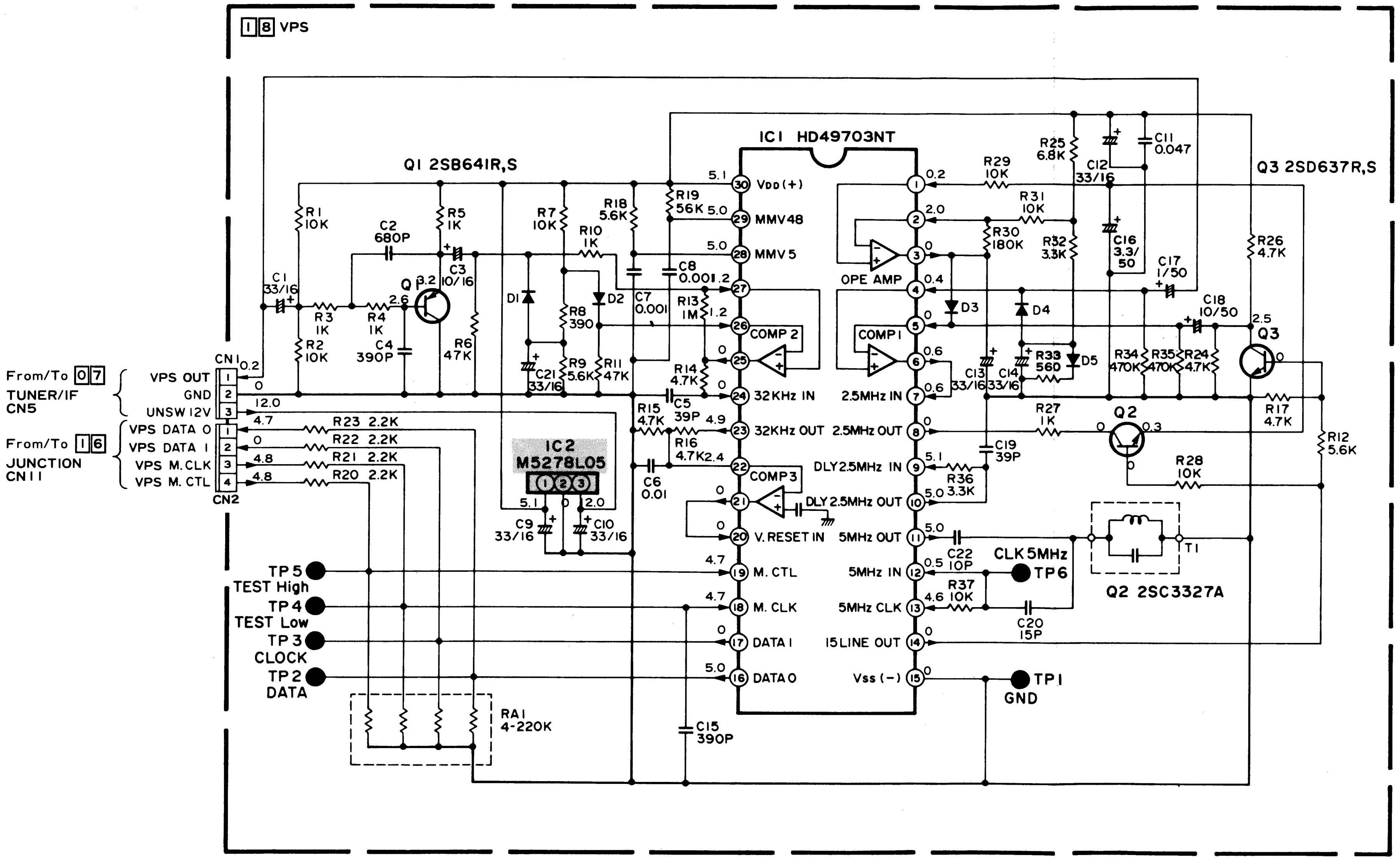
14 DEMODULATOR
IC1 M51365SP
LIM
FM DET
IF AMP
IF AGC
VCO
-45°
+45°
APC DET
VIDEO DET
LOCK CTL
Vcc
GND
CF1 5.5MHz
R15 470
CF2 5.5MHz
R16 820
C15 0.047
C17 0.0022
C16 33/16
L3 6.8
Q3 2SC3354S,T
R9 330
R11 560
C14 0.0022
SAW1
L1
L2 11.5
R21 8.2K
R78 82
R23 2.7K
C1 0.001
R14 100
C12 0.0022
R12 100
C13 0.001
R13 33
From 07 TUNER/IF, CN7
IF IN
CN4
C19 0.47/50
R18 820K
C22 33/16
C21 0.0022
L4 6.8
Q1 2SD1292Q,R,OR 2SC26550,Y
R1 560
C2 47/16
T3 5.5MHz DET
C23 0.01
C24 100P
R22 2.2K
R24 22K
L9 220
C26 10/16
C27 1/50
C29 47/16
C28 0.0022
C31 27P
T4 VCO 38.9MHz
C32 0.47/50
R26 47
R27 560
L6 6.8
R86 100
R32 330
Q4 2SC3354S,T
R33 330
Q11 DTC114ES
Q12 DTC114ES
Q19 DTC144ES
Q20 DTC114ES
R42 10K
R43 10K
D7
R51 10K
R52 10K
R84 10K
D2
C64 47/16
D5
D6
R53 330
R56 330
R54 10K
R55 10K
Q13 DTC114ES
Q14 DTC114ES
CN2
1 BILING LED
2 STELEO LED
3 BILING CTL (SUB/MAIN)
To 16 JUNCTION CN5
R31 SEPARATION
R31 10K
From 07 TUNER/IF, CN3
CN3
SWD 12V 1
SWD 9V 2
MUTE IN 3
C30 10/16
C37 0.0039
C38 0.0039
C39 0.0039
C41 10/16
C42 10/16
R44 12K
C43 47/16
IC2 TDA3800GS
OUTPUT SW
CONTROL LOGIC
MATRIX
COMP
DIF AMP
FM DET
PILOT AMP
PILOT DET
Vcc
GND
R36 470
CF4 5.74MHz
C44 0.022
R45 820
C45 0.047
CF5 5.74MHz
R46 1K
C46 1000
T5 5.74MHz
T6 54.7KHz
R48 27K
C47 470/16
C51 0.047
C52 10/16
C53 10/16
C50 0.0022
C49 1000/16
R73 220K
R74 390K
R75 10K
R76 100K
C63 33/16
Q17 2SC3311AR,S
Q18 2SC3311AR,S
BPF1 PU58226
BPF 117.5Hz(ST)
BPF 274.1Hz(DL)
GND CEXT
C54 1/50
R66 820
FH TRAP
T7
C65 0.012
R57 3.3K
R57 L LEVEL
Q15 2SD1450S,T
R58 4.7K
R59 10K
CN1
1 MAIN(L CH) OUT
2 GND(S)
3 SUB(R CH) OUT
To 09 AUDIO, CN2
R67 820
FH TRAP
T8
C66 0.012
R62 3.3K
R62 R LEVEL
Q16 2SD1450S,T
R63 4.7K
R64 10K

NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.

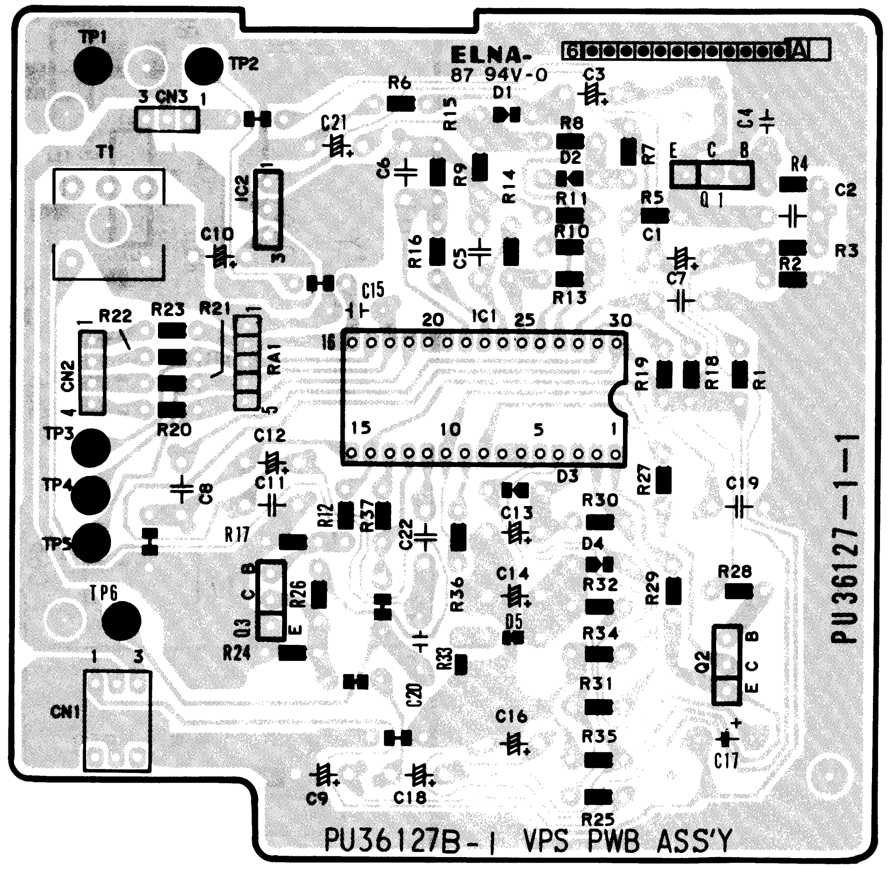
3.21 DEMODULATOR CIRCUIT BOARD (HR-D470E/EG ONLY)


6
5
4
3
2
1
A
B
C
E
F
G
H
GCMK-77X
DEMOD PWB ASS'Y
PU22418 A B C -01
IF IN
SAW1
IC2
CN1
CN2
CN3
CN4
J1
BPF1
T3
T4
T5
T6
T7
T8
L1
L2
L3
L4
L6
L9
CF1
CF2
CF4
CF5
Q1
Q3
Q4
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
D2
D5
D6
D7
R62
R57
R31
R62
R LEVEL
R57
L LEVEL
R31
SEPARATION

3.22 VPS SCHEMATIC DIAGRAM (HR-D470E/EG ONLY)


18 VPS
From/To 07
TUNER/IF
CN5
From/To 16
JUNCTION
CN11
CN1
VPS OUT 1
GND 2
UNSW 12V 3
VPS DATA 0 1
VPS DATA 1 2
VPS M.CLK 3
VPS M. CTL 4
CN2
Q1 2SB641R,S
IC1 HD49703NT
Q3 2SD637R,S
IC2 M5278L05
Q2 2SC3327A
VDD(+)
MMV48
MMV5
COMP 2
COMP 3
COMP 1
OPE AMP
32KHz IN
32KHz OUT
V. RESET IN
M. CTL
M. CLK
DATA I
DATA O
2.5MHz IN
2.5MHz OUT
DLY2.5MHz IN
DLY 2.5MHz OUT
5MHz OUT
5MHz IN
5MHz CLK
15LINE OUT
Vss (−)
CLK 5MHz
TP6
TP1
GND
TP5
TEST High
TP4
TEST Low
TP3
CLOCK
TP2
DATA
RA1
4-220K
T1
R1 10K
R2 10K
R3 1K
R4 1K
R5 1K
R6 47K
R7 10K
R8 390
R9 5.6K
R10 1K
R11 47K
R12 5.6K
R13 1M
R14 4.7K
R15 4.7K
R16 4.7K
R17 4.7K
R18 5.6K
R19 56K
R20 2.2K
R21 2.2K
R22 2.2K
R23 2.2K
R24 4.7K
R25 6.8K
R26 4.7K
R27 1K
R28 10K
R29 10K
R30 180K
R31 10K
R32 3.3K
R33 560
R34 470K
R35 470K
R36 3.3K
R37 10K
C1 33/16
C2 680P
C3 10/16
C4 390P
C5 39P
C6 0.01
C7 0.001
C8 0.001
C9 33/16
C10 33/16
C11 0.047
C12 33/16
C13 33/16
C14 33/16
C15 390P
C16 3.3/50
C17 1/50
C18 10/50
C19 39P
C20 15P
C21 33/16
C22 10P
D1
D2
D3
D4
D5

3.23 VPS CIRCUIT BOARD (HR-D470E/EG ONLY)


TP1
TP2
ELNA-
87 94V-0
CN3
T1
IC2
IC1
CN2
CN1
TP3
TP4
TP5
TP6
Q1
Q2
Q3
RA1
PU36127-1-1
PU36127B-1 VPS PWB ASS'Y

NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.

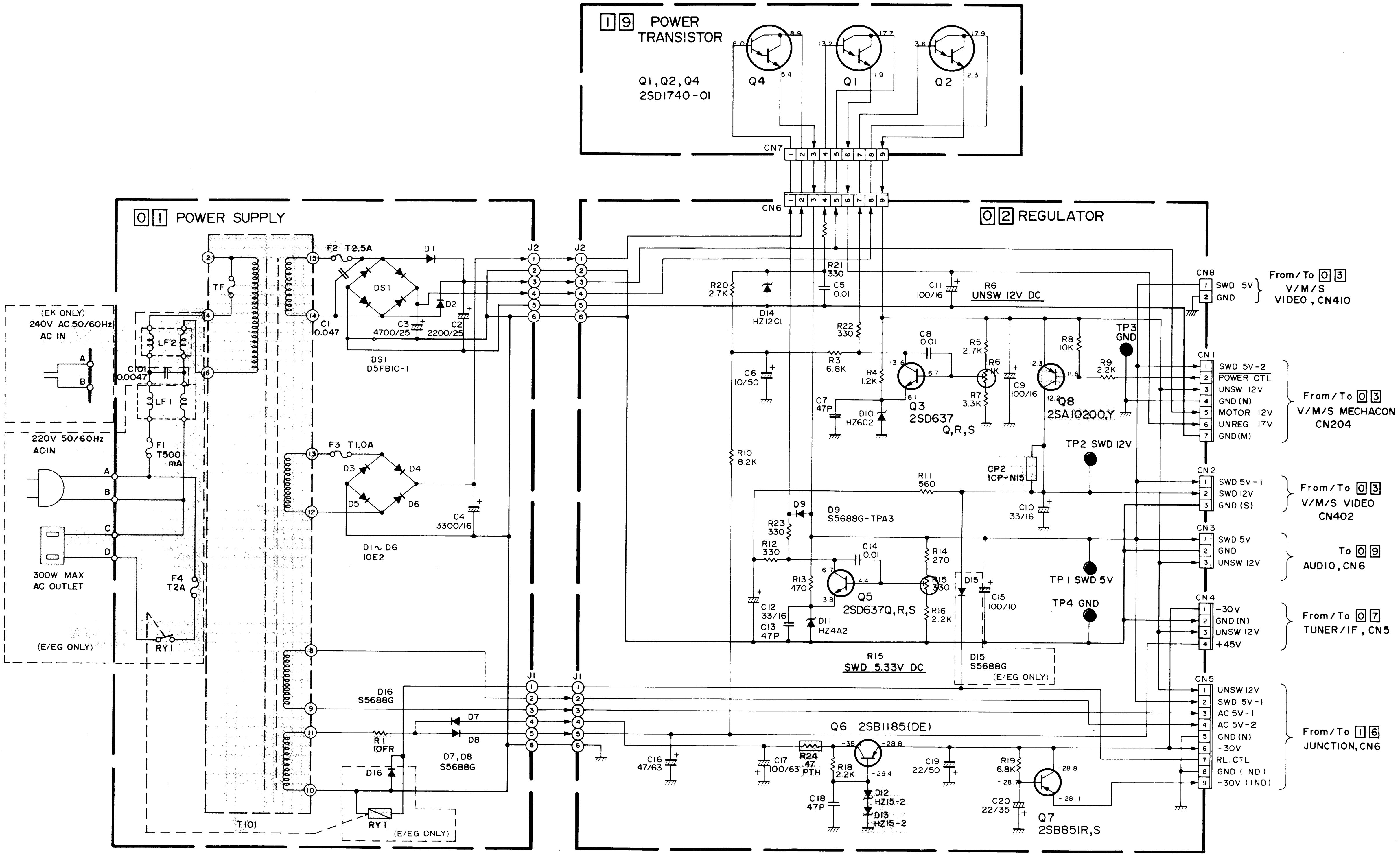
6

3.24 POWER TRANSFORMER, REGULATOR AND POWER TRANSISTOR SCHEMAITC DIAGRAMS

3.25 PO

— POWE

5

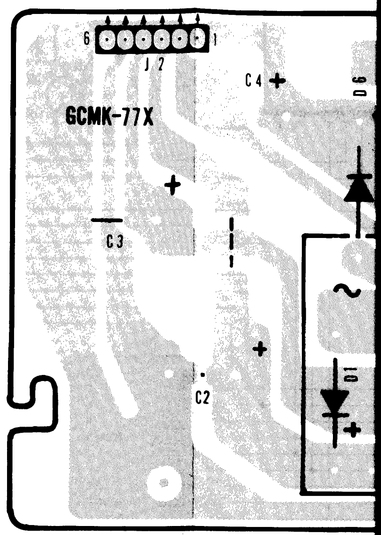


1 9 POWER TRANSISTOR
Q1,Q2,Q4 2SD1740-01
Q4
Q1
Q2
CN7
CN6
0 1 POWER SUPPLY
0 2 REGULATOR
(EK ONLY) 240V AC 50/60Hz AC IN
220V 50/60Hz ACIN
300W MAX AC OUTLET
(E/EG ONLY)
LF2
LF1
C101 0.0047
F1 T500 mA
F4 T2A
RY1
TF
T101
F2 T2.5A
D1
DS1
C1 0.047
C3 4700/25
C2 2200/25
DS1 D5FB10-1
D2
F3 T1.0A
D3
D4
D5
D6
C4 3300/16
D1 ~ D6 10E2
D16 S5688G
D7
D8
D7, D8 S5688G
R1 10FR
D16
RY1
(E/EG ONLY)
J2
J1
R20 2.7K
D14 HZ12C1
R21 330
C5 0.01
C11 100/16
R6 UNSW 12V DC
R22 330
C8 0.01
R5 2.7K
R8 10K
TP3 GND
R9 2.2K
C6 10/50
R3 6.8K
R4 1.2K
R6 1K
C9 100/16
C7 47P
D10 HZ6C2
Q3 2SD637 Q,R,S
R7 3.3K
Q8 2SA10200,Y
TP2 SWD 12V
R10 8.2K
R11 560
CP2 ICP-N15
C10 33/16
D9
D9 S5688G-TPA3
R23 330
R12 330
C14 0.01
R14 270
R13 470
Q5 2SD637Q,R,S
R15 330
D15
C15 100/10
TP1 SWD 5V
TP4 GND
C12 33/16
C13 47P
D11 HZ4A2
R16 2.2K
R15 SWD 5.33V DC
D15 S5688G (E/EG ONLY)
Q6 2SB1185(DE)
C16 47/63
C17 100/63
R24 47 PTH
R18 2.2K
C19 22/50
R19 6.8K
D12 HZ15-2
D13 HZ15-2
C18 47P
C20 22/35
Q7 2SB851R,S
CN8 1 SWD 5V 2 GND
From/To 0 3 V/M/S VIDEO, CN410
CN1 1 SWD 5V-2 2 POWER CTL 3 UNSW 12V 4 GND (N) 5 MOTOR 12V 6 UNREG 17V 7 GND (M)
From/To 0 3 V/M/S MECHACON CN204
CN2 1 SWD 5V-1 2 SWD 12V 3 GND (S)
From/To 0 3 V/M/S VIDEO CN402
CN3 1 SWD 5V 2 GND 3 UNSW 12V
To 0 9 AUDIO, CN6
CN4 1 -30V 2 GND (N) 3 UNSW 12V 4 +45V
From/To 0 7 TUNER/IF, CN5
CN5 1 UNSW 12V 2 SWD 5V-1 3 AC 5V-1 4 AC 5V-2 5 GND (N) 6 -30V 7 RL CTL 8 GND (IND) 9 -30V (IND)
From/To 1 6 JUNCTION, CN6

4

3

2

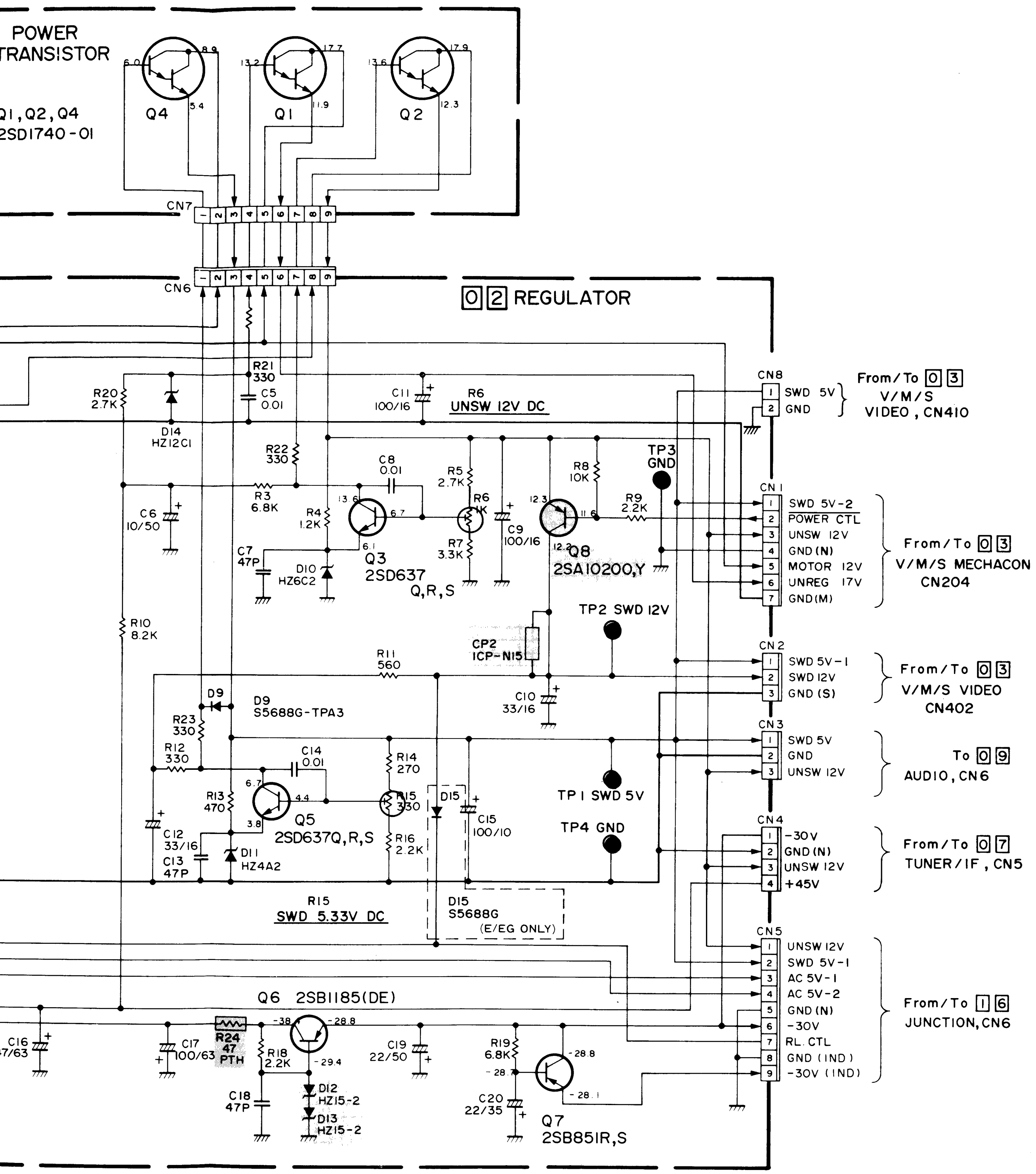


J7
GCMK-77X
C4
C3
C2

NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.

1

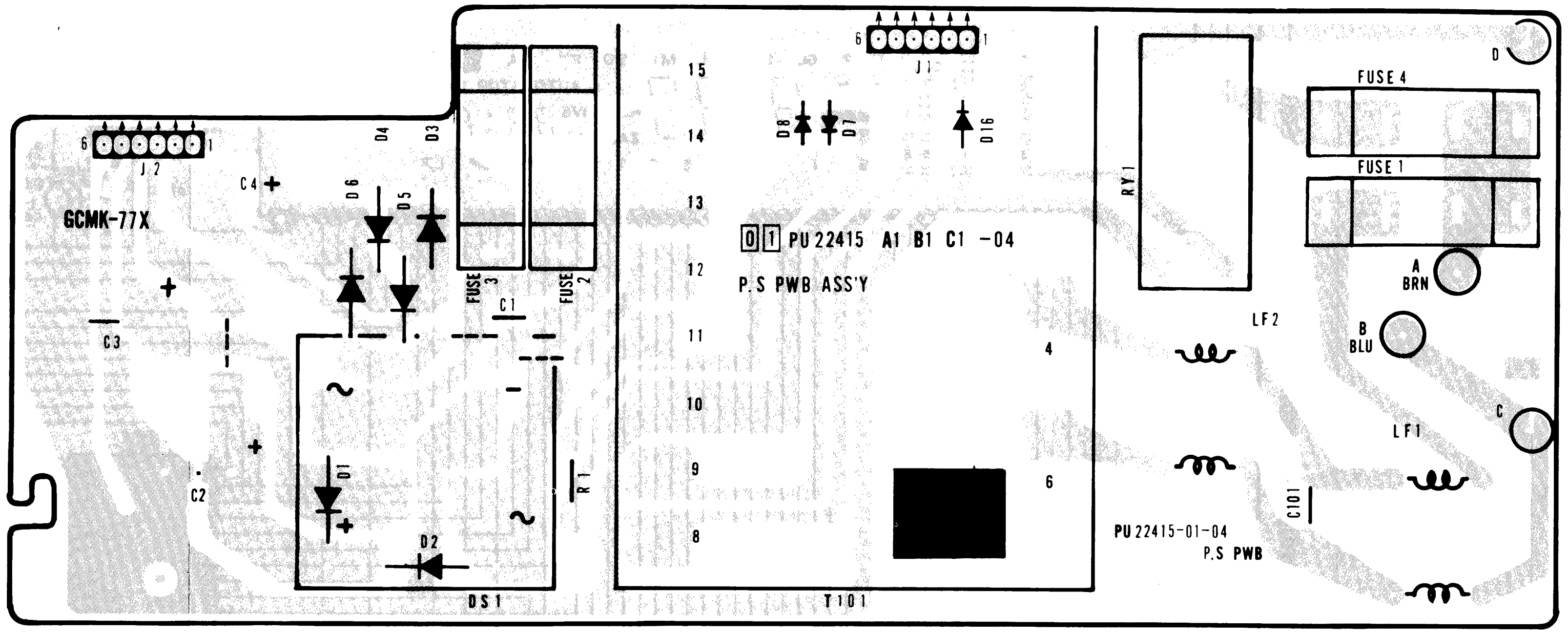
A B C D E F G H


POWER
TRANSISTOR
Q1, Q2, Q4
2SD1740-01
Q4
Q1
Q2
CN7
CN6
02 REGULATOR
R21 330
C5 0.01
C11 100/16
R6 UNSW 12V DC
R20 2.7K
D14 HZ12C1
R22 330
C8 0.01
R5 2.7K
R6 1K
R8 10K
R9 2.2K
TP3 GND
R3 6.8K
R4 1.2K
C6 10/50
C7 47P
D10 HZ6C2
Q3 2SD637 Q,R,S
R7 3.3K
C9 100/16
Q8 2SA10200,Y
TP2 SWD 12V
CP2 ICP-N15
R10 8.2K
R11 560
C10 33/16
D9 S5688G-TPA3
R23 330
R12 330
C14 0.01
R14 270
R13 470
Q5 2SD637Q,R,S
R15 330
R16 2.2K
D15
C15 100/10
TP1 SWD 5V
TP4 GND
C12 33/16
C13 47P
D11 HZ4A2
R15 SWD 5.33V DC
D15 S5688G (E/EG ONLY)
Q6 2SB1185(DE)
C16 47/63
C17 100/63
R24 47 PTH
R18 2.2K
C18 47P
D12 HZ15-2
D13 HZ15-2
C19 22/50
R19 6.8K
C20 22/35
Q7 2SB851R,S
CN8
SWD 5V
GND
From/To 03 V/M/S VIDEO, CN410
CN1
SWD 5V-2
POWER CTL
UNSW 12V
GND (N)
MOTOR 12V
UNREG 17V
GND (M)
From/To 03 V/M/S MECHACON CN204
CN2
SWD 5V-1
SWD 12V
GND (S)
From/To 03 V/M/S VIDEO CN402
CN3
SWD 5V
GND
UNSW 12V
To 09 AUDIO, CN6
CN4
-30V
GND (N)
UNSW 12V
+45V
From/To 07 TUNER/IF, CN5
CN5
UNSW 12V
SWD 5V-1
AC 5V-1
AC 5V-2
GND (N)
-30V
RL. CTL
GND (IND)
-30V (IND)
From/To 16 JUNCTION, CN6

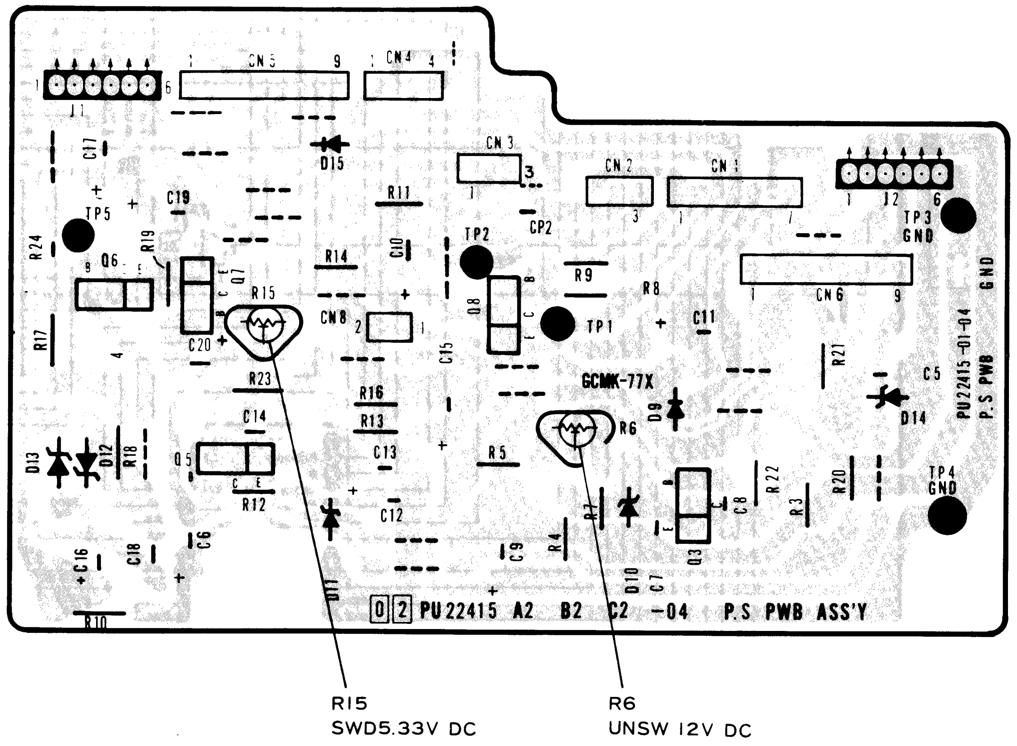
NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.

3.25 POWER TRANSFORMER, REGULATOR AND POWER TRANSISTOR CIRCUIT BOARDS

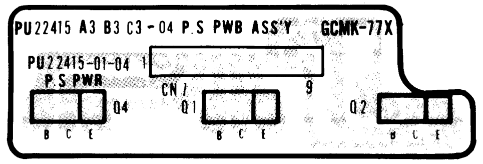
– POWER TRANSFORMER –


J2
J1
GCMK-77X
C4
D6
D5
D4
D3
FUSE 3
FUSE 2
C1
C3
C2
D1
D2
DS1
R1
01 PU 22415 A1 B1 C1 -04
P.S PWB ASS'Y
D8
D7
D16
T101
RY1
FUSE 4
FUSE 1
A BRN
B BLU
C
D
LF2
LF1
C101
PU 22415-01-04 P.S PWB

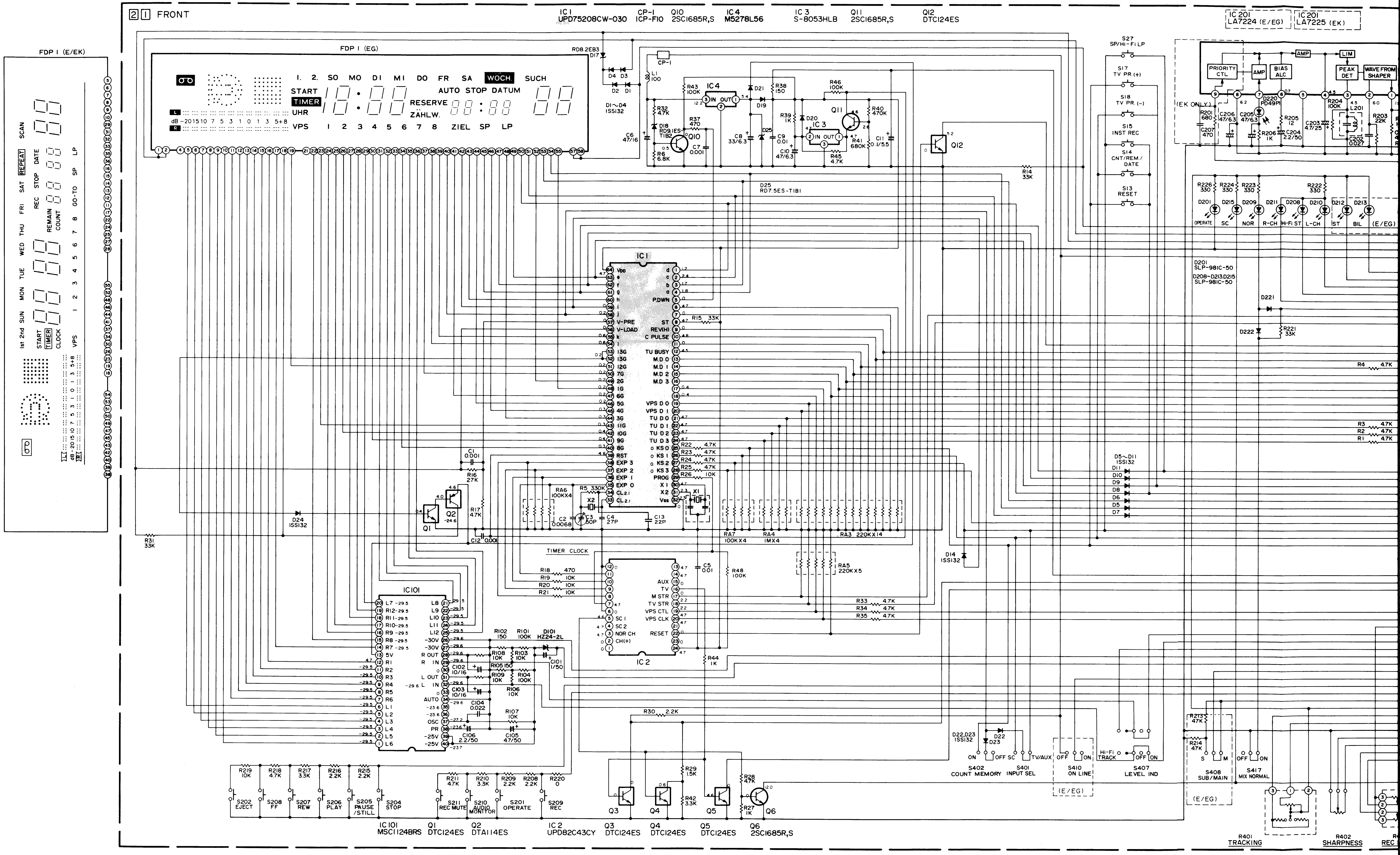
– REGULATOR –


J1
CN5
CN4
CN3
CN2
CN1
J2
CN6
TP5
TP2
TP1
TP3 GND
TP4 GND
GCMK-77X
02 PU 22415 A2 B2 C2 -04 P.S PWB ASS'Y
PU 22415-01-04 P.S PWB
R15 SWD5.33V DC
R6 UNSW 12V DC

– POWER TRANSISTOR –

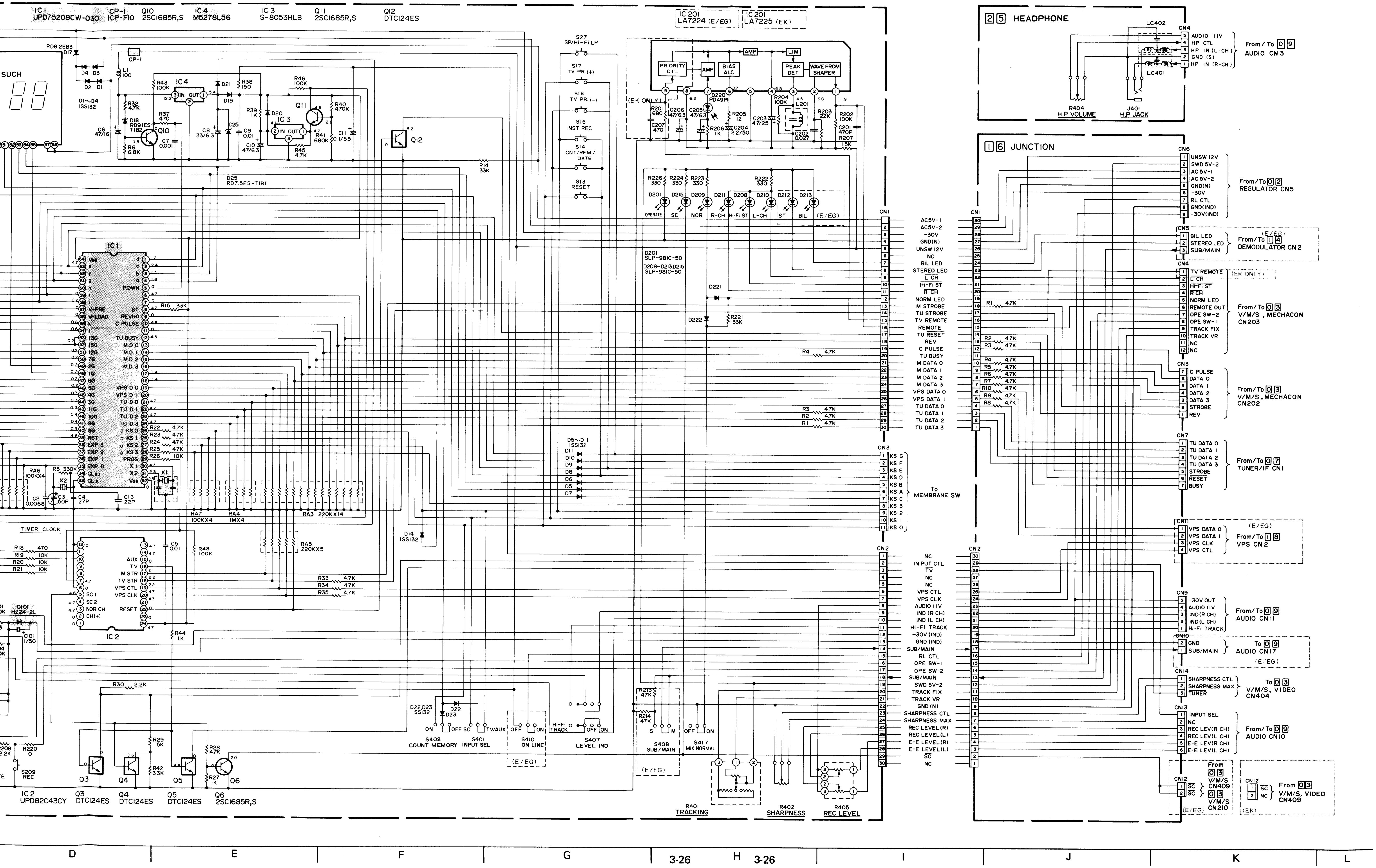

PU22415 A3 B3 C3 - 04 P.S PWB ASS'Y
GCMK-77X
PU22415-01-04 P.S PWB
CN7
Q4
Q1
Q2
B C E

3.26 FRONT, HEADPHONE AND JUNCTION SCHEMATIC DIAGRAMS



2 1 FRONT
IC 1 UPD75208CW-030
CP-1 ICP-F10
Q10 2SC1685R,S
IC4 M5278L56
IC3 S-8053HLB
Q11 2SC1685R,S
Q12 DTC124ES
IC 201 LA7224 (E/EG)
IC201 LA7225 (EK)
FDP 1 (E/EK)
FDP 1 (EG)
SCAN
REPEAT
STOP
DATE
SAT
REC
FRI
REMAIN
COUNT
GO-TO
THU
WED
TUE
MON
SUN
1st 2nd
START
TIMER
CLOCK
VPS
SP
LP
1. 2. SO MO DI MI DO FR SA WOCH. SUCH
START
TIMER
UHR
AUTO STOP DATUM
RESERVE
ZÄHLW.
dB -2015 10 7 5 3 1 0 1 3 5+8
VPS 1 2 3 4 5 6 7 8 ZIEL SP LP
RD8.2EB3 D17
D4 D3
D2 D1
D1~D4 1SS132
C6 47/16
L1 100
R32 4.7K
D18 RD9.1ES-T1B2
R6 6.8K
R37 470
Q10
C7 0.001
R43 100K
IN OUT
D21
D19
R38 150
C8 33/6.3
D25
C9 0.01
C10 47/6.3
R39 1K
D20
IC3
R46 100K
Q11
R40 470K
R41 680K
C11 0.1/5.5
R45 4.7K
Q12
R14 33K
D25 RD7.5ES-T1B1
S27 SP/HI-FI LP
S17 TV PR.(+)
S18 TV PR.(-)
S15 INST REC
S14 CNT/REM/DATE
S13 RESET
PRIORITY CTL
AMP
BIAS ALC
LIM
PEAK DET
WAVE FROM SHAPER
(EK ONLY)
R201 680
C207 470
C206 47/6.3
C205 47/6.3
D220 PD49PI
R205 12
R206 1K
C204 2.2/50
R204 100K
C203 4.7/25
L201
C202 0.027
R203 22K
R226 330
R224 330
R223 330
R222 330
D201 D215 D209 D211 D208 D210 D212 D213
OPERATE SC NOR R-CH Hi-Fi ST L-CH IST BIL (E/EG)
D201 SLP-981C-50
D208~D213,D215 SLP-981C-50
D221
D222
R221 33K
R4 4.7K
R3 4.7K
R2 4.7K
R1 4.7K
IC1
Vdd
P.DWN
V-PRE
V-LOAD
ST
REV(H)
C PULSE
TU BUSY
M.D 0
M.D 1
M.D 2
M.D 3
VPS D 0
VPS D 1
TU D 0
TU D 1
TU D 2
TU D 3
KS 0
KS 1
KS 2
KS 3
PROG
X1
X2
Vss
RST
EXP 3
EXP 2
EXP 1
EXP 0
CL2
CL1
R15 33K
R22 4.7K
R23 4.7K
R24 4.7K
R25 4.7K
R26 10K
X1
RA6 100KX4
R5 330K
X2
C2 0.0068
C3 60P
C4 27P
C13 22P
RA7 100KX4
RA4 1MX4
RA3 220KX14
C1 0.001
R16 27K
R17 4.7K
Q1
Q2
C12 0.001
D24 1SS132
R31 33K
D5~D11 1SS132
D14 1SS132
TIMER CLOCK
R18 470
R19 10K
R20 10K
R21 10K
C5 0.01
R48 100K
RA5 220KX5
AUX
TV
M STR
TV STR
VPS CTL
VPS CLK
SC 1
SC 2
NOR CH
CH(+)
RESET
IC 2
R33 4.7K
R34 4.7K
R35 4.7K
R44 1K
IC101
L7 L8 R12 L9 R11 L10 R10 L11 R9 L12 R8 -30V R7 -30V 5V R OUT R1 R IN R2 R3 L OUT R4 L IN R5 R6 AUTO L1 L2 OSC L3 PR L4 L5 -25V L6 -25V
R102 150
R101 100K
D101 HZ24-2L
R108 10K
R103 10K
R105 150
C101 1/50
C102 10/16
R109 10K
R104 100K
C103 10/16
R106 10K
C104 0.022
R107 10K
C106 2.2/50
C105 47/50
R30 2.2K
R29 1.5K
R42 33K
R28 47K
R27 1K
Q3 Q4 Q5 Q6
D22,D23 1SS132
D22 D23
ON OFF SC TV/AUX OFF ON
S402 COUNT MEMORY
S401 INPUT SEL
S410 ON LINE
(E/EG)
Hi-Fi TRACK OFF ON
S407 LEVEL IND
R213 47K
R214 47K
S M
S408 SUB/MAIN
(E/EG)
OFF ON
S417 MIX NORMAL
R401 TRACKING
R402 SHARPNESS
REC
R219 10K
R218 4.7K
R217 3.3K
R216 2.2K
R215 2.2K
S202 EJECT
S208 FF
S207 REW
S206 PLAY
S205 PAUSE /STILL
S204 STOP
R211 4.7K
R210 3.3K
R209 2.2K
R208 2.2K
R220 0
S211 REC MUTE
S210 AUDIO MONITOR
S201 OPERATE
S209 REC
IC101 MSC1124BRS
Q1 DTC124ES
Q2 DTA114ES
IC 2 UPD82C43CY
Q3 DTC124ES
Q4 DTC124ES
Q5 DTC124ES
Q6 2SC1685R,S
6
5
4
3
2
1
A B C D E F G H

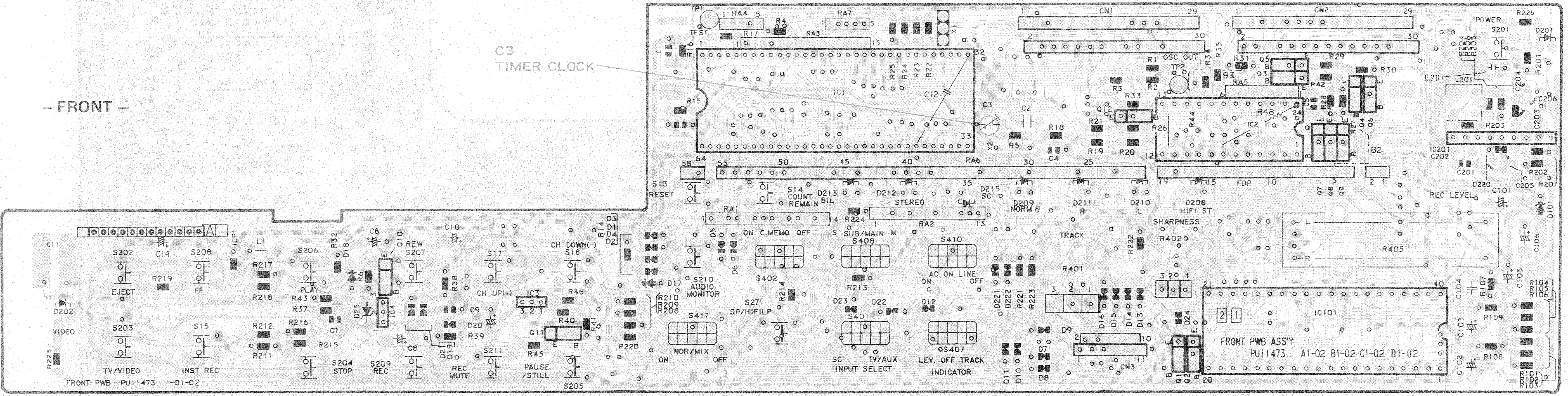
NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.



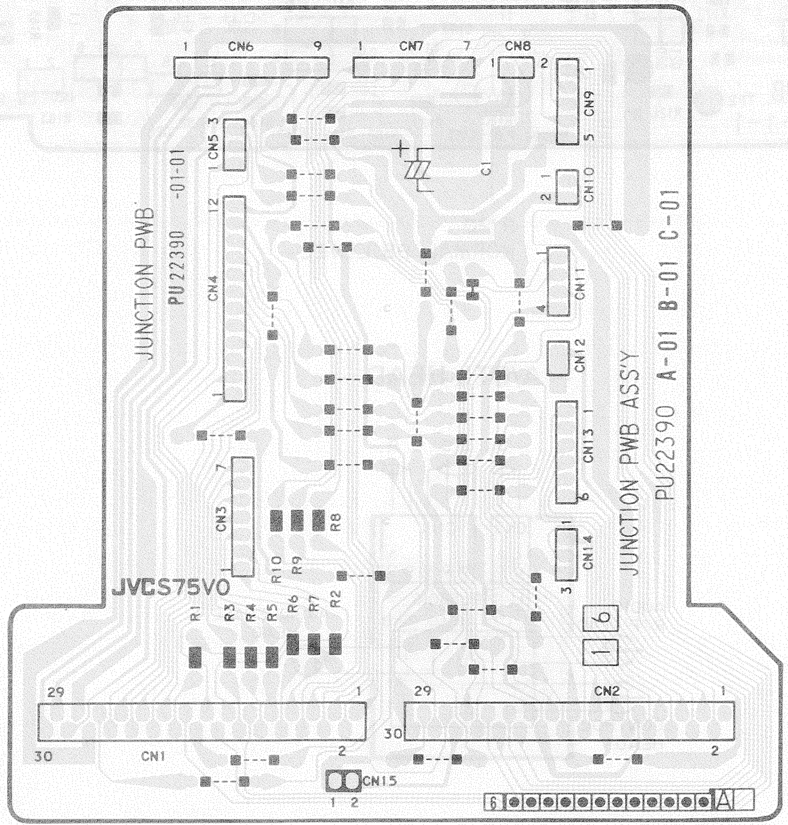
IC1 UPD75208CW-030
CP-1 ICP-F10
Q10 2SC1685R,S
IC4 M5278L56
IC3 S-8053HLB
Q11 2SC1685R,S
Q12 DTC124ES
IC201 LA7224 (E/EG)
IC201 LA7225 (EK)
SUCH
RD8.2EB3 D17
D4 D3 D2 D1
D1~D4 1SS132
CP-1
L1 100
C6 47/16
R32 4.7K
D18 RD9.1ES-T1B2
R6 6.8K
R37 470
Q10
C7 0.001
R43 100K
IC4
IN OUT
D21
R38 150
D19
C8 33/6.3
D25
C9 0.01
C10 47/6.3
R39 1K
D20
IC3
R46 100K
Q11
R45 4.7K
R41 680K
C11 0.1/5.5
R40 470K
Q12
R14 33K
D25 RD7.5ES-T1B1
S27 SP/Hi-Fi LP
S17 TV PR.(+)
S18 TV PR.(-)
S15 INST REC
S14 CNT/REM./DATE
S13 RESET
PRIORITY CTL
AMP
BIAS ALC
AMP
LIM
PEAK DET
WAVE FROM SHAPER
(EK ONLY)
R201 680
C207 470
C206 47/6.3
C205 47/6.3
D220 PD49PI
R206 1K
R205 12
C204 2.2/50
C203 4.7/25
R204 100K
L201
C202 0.027
R203 22K
R202 100K
C201 470P
R207 1.5K
R226 330
R224 330
R223 330
R222 330
D201 OPERATE
D215 SC
D209 NOR
D211 R-CH
D208 Hi-Fi ST
D210 L-CH
D212 ST
D213 BIL
(E/EG)
D201 SLP-981C-50
D208~D213,D215 SLP-981C-50
D221
D222
R221 33K
IC1
Vdd d c b a P.DWN h i j V-PRE V-LOAD k l ST REV(H) C PULSE TU BUSY
13G 12G 7G 2G 1G 6G 5G 4G 3G 11G 10G 9G 8G RST EXP 3 EXP 2 EXP 1 EXP 0 CL2 CL1
M.D 0 M.D 1 M.D 2 M.D 3 VPS D 0 VPS D 1 TU D 0 TU D 1 TU D 2 TU D 3 KS 0 KS 1 KS 2 KS 3 PROG X1 X2 Vss
R15 33K
R22 4.7K
R23 4.7K
R24 4.7K
R25 4.7K
R26 10K
X1
RA6 100KX4
R5 330K
X2
C2 0.0068
C3 60P
C4 27P
C13 22P
RA7 100KX4
RA4 1MX4
RA3 220KX14
RA5 220KX5
D5~D11 1SS132
D11 D10 D9 D8 D6 D5 D7
D14 1SS132
TIMER CLOCK
R18 470
R19 10K
R20 10K
R21 10K
AUX TV M STR TV STR VPS CTL VPS CLK RESET
SC1 SC2 NOR CH CH(+)
IC2
C5 0.01
R48 100K
R33 4.7K
R34 4.7K
R35 4.7K
R44 1K
D101 HZ24-2L
C101 1/50
R30 2.2K
R29 1.5K
R42 3.3K
R28 4.7K
R27 1K
R220
S209 REC
Q3 Q4 Q5 Q6
IC2 UPD82C43CY
Q3 DTC124ES
Q4 DTC124ES
Q5 DTC124ES
Q6 2SC1685R,S
D22,D23 1SS132
D22 D23
S402 COUNT MEMORY
S401 INPUT SEL
ON OFF SC TV/AUX
S410 ON LINE
OFF ON
Hi-Fi TRACK
S407 LEVEL IND
R213 47K
R214 47K
S408 SUB/MAIN
S M
S417 MIX NORMAL
OFF ON
R401 TRACKING
R402 SHARPNESS
R405 REC LEVEL
R4 4.7K
R3 4.7K
R2 4.7K
R1 4.7K
CN1
AC5V-1 AC5V-2 -30V GND(N) UNSW 12V NC BIL LED STEREO LED L CH Hi-Fi ST R CH NORM LED M STROBE TU STROBE TV REMOTE REMOTE TU RESET REV C PULSE TU BUSY M DATA 0 M DATA 1 M DATA 2 M DATA 3 VPS DATA 0 VPS DATA 1 TU DATA 0 TU DATA 1 TU DATA 2 TU DATA 3
CN3
KS G KS F KS E KS D KS B KS A KS C KS 3 KS 2 KS 1 KS 0
To MEMBRANE SW
CN2
NC INPUT CTL TV NC NC VPS CTL VPS CLK AUDIO 11V IND (R CH) IND (L CH) Hi-Fi TRACK -30V (IND) GND (IND) SUB/MAIN RL CTL OPE SW-1 OPE SW-2 SUB/MAIN SWD 5V-2 TRACK FIX TRACK VR GND (N) SHARPNESS CTL SHARPNESS MAX REC LEVEL(R) REC LEVEL(L) E-E LEVEL(R) E-E LEVEL(L) SC NC
2 5 HEADPHONE
LC402
LC401
CN4
AUDIO 11V
HP CTL
HP IN (L-CH)
GND (S)
HP IN (R-CH)
From/To 0 9 AUDIO CN3
R404 H.P VOLUME
J401 H.P JACK
1 6 JUNCTION
CN6
UNSW 12V SWD 5V-2 AC 5V-1 AC 5V-2 GND(N) -30V RL CTL GND(IND) -30V(IND)
From/To 0 2 REGULATOR CN5
CN5
BIL LED STEREO LED SUB/MAIN
(E/EG)
From/To 1 4 DEMODULATOR CN2
CN4
TV REMOTE (EK ONLY) L CH Hi-Fi ST R CH NORM LED REMOTE OUT OPE SW-2 OPE SW-1 TRACK FIX TRACK VR NC NC
From/To 0 3 V/M/S, MECHACON CN203
R1 4.7K
R2 4.7K
R3 4.7K
R4 4.7K
R5 4.7K
R6 4.7K
R7 4.7K
R10 4.7K
R9 4.7K
R8 4.7K
CN3
C PULSE DATA 0 DATA 1 DATA 2 DATA 3 STROBE REV
From/To 0 3 V/M/S, MECHACON CN202
CN7
TU DATA 0 TU DATA 1 TU DATA 2 TU DATA 3 STROBE RESET BUSY
From/To 0 7 TUNER/IF CN1
CN11
VPS DATA 0 VPS DATA 1 VPS CLK VPS CTL
(E/EG)
From/To 1 8 VPS CN2
CN9
-30V OUT AUDIO 11V IND(R CH) IND(L CH) Hi-Fi TRACK
From/To 0 9 AUDIO CN11
CN10
GND SUB/MAIN
To 0 9 AUDIO CN17
(E/EG)
CN14
SHARPNESS CTL SHARPNESS MAX TUNER
To 0 3 V/M/S, VIDEO CN404
CN13
INPUT SEL NC REC LEV(R CH) REC LEV(L CH) E-E LEV(R CH) E-E LEV(L CH)
From/To 0 9 AUDIO CN10
CN12
SC SC
From 0 3 V/M/S CN409
0 3 V/M/S CN210
(E/EG)
CN12
SC NC
From 0 3 V/M/S, VIDEO CN409
(EK)
D
E
F
G
H
I
J
K
L

3.27 FRONT, HEADPHONE AND JUNCTION CIRCUIT BOARDS

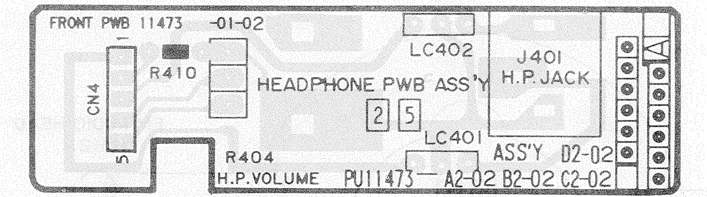
– FRONT –


C3
TIMER CLOCK
TEST
IC1
IC2
CN1
CN2
OSC OUT
POWER
S13 RESET
S14 COUNT REMAIN
STEREO
BIL
NORM
HIFI ST
FDP
SHARPNESS
TRACK
REC LEVEL
S202 EJECT
S203 VIDEO
S208 FF
S15 INST REC
TV/VIDEO
FRONT PWB PU11473 -01-02
S206 PLAY
S204 STOP
S207 REW
S209 REC
S17 CH UP(+)
REC MUTE
S211
S18 CH DOWN(-)
S205 PAUSE /STILL
S210 AUDIO MONITOR
S402 ON C.MEMO OFF
S27 SP/HIFILP
S417 NOR/MIX ON OFF
S408 SUB/MAIN M
S401 SC TV/AUX INPUT SELECT
S410 AC ON LINE OFF
S407 LEV. OFF TRACK INDICATOR
IC101
CN3
FRONT PWB ASS'Y PU11473 A1-02 B1-02 C1-02 D1-02

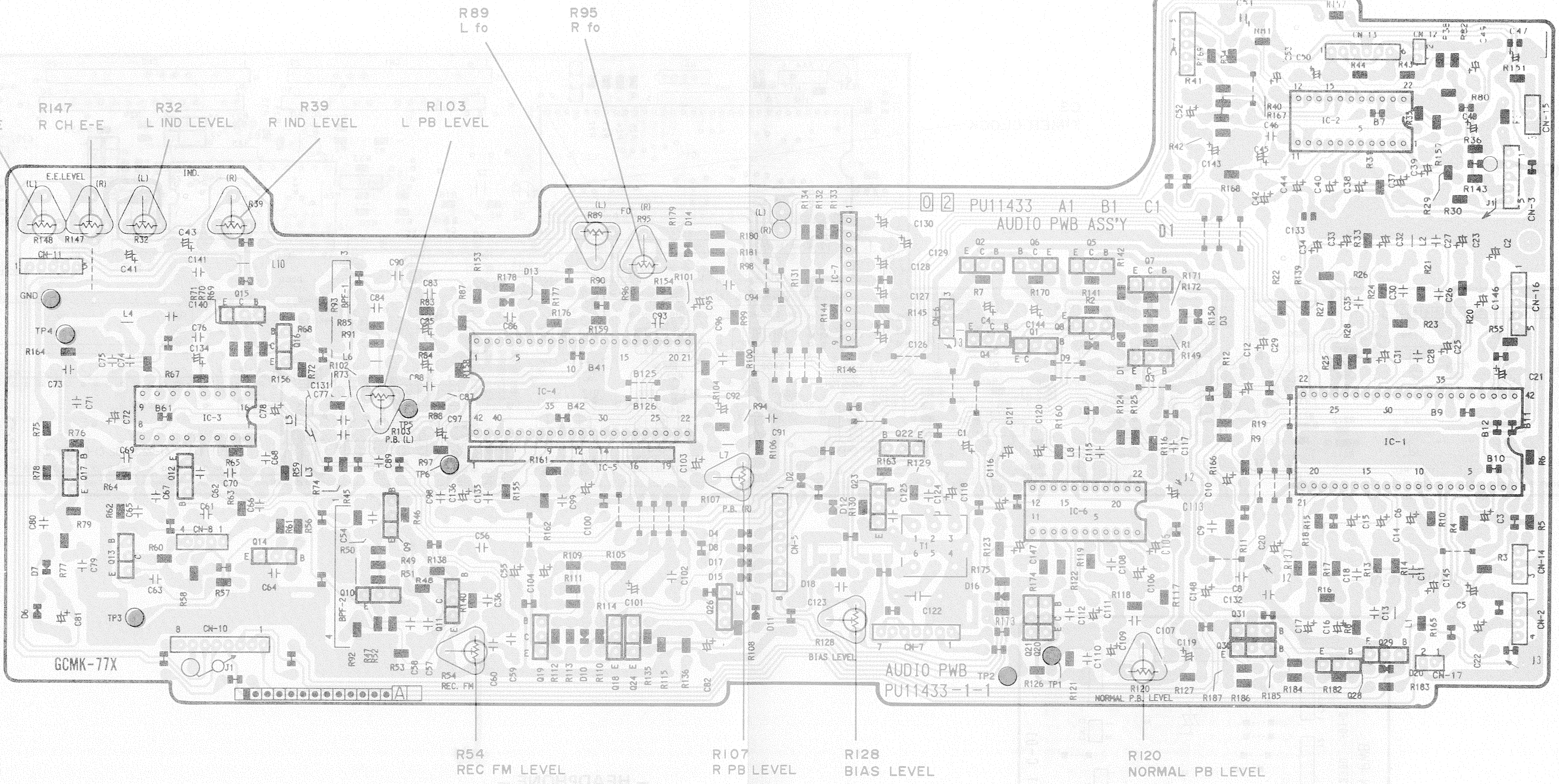
– JUNCTION –


CN6
CN7
CN8
CN9
CN5
CN10
CN4
CN11
CN12
CN13
CN3
CN14
CN1
CN2
CN15
JUNCTION PWB PU 22390 -01-01
JUNCTION PWB ASS'Y PU22390 A-01 B-01 C-01
JVCS75V0

– HEADPHONE –

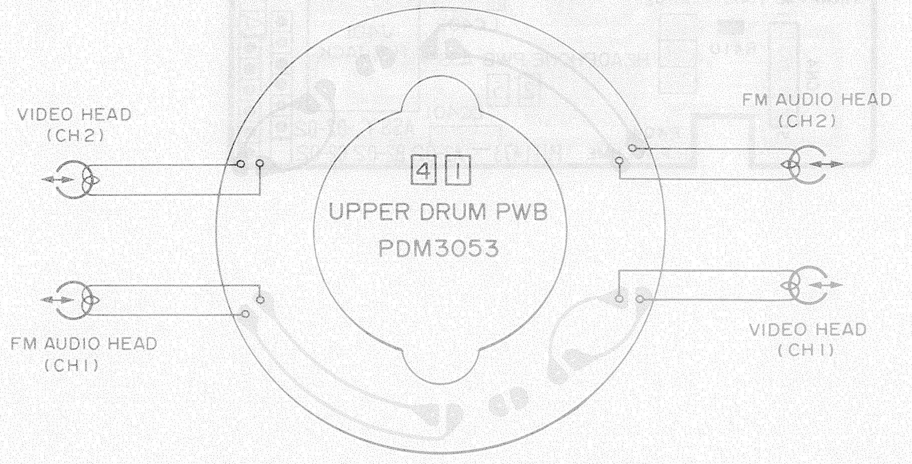

FRONT PWB 11473 -01-02
CN4
R410
LC402
J401 H.P.JACK
HEADPHONE PWB ASS'Y
LC401
R404
H.P.VOLUME
PU11473 A2-02 B2-02 C2-02
ASS'Y D2-02

3.28 AUDIO, DECK TERMINAL, LED, RELAY, A/CTL HEAD, REC SAFETY, UPPER DRUM AND END SENSOR CIRCUIT BOARDS



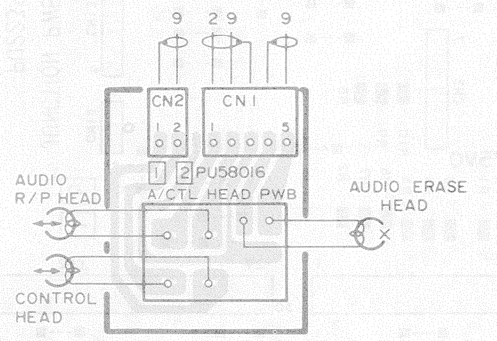
R148
L CH E-E
R147
R CH E-E
R32
L IND LEVEL
R39
R IND LEVEL
R103
L PB LEVEL
R89
L fo
R95
R fo
E.E.LEVEL
IND.
GND
TP1
TP2
TP3
TP4
TP5
TP6
GCMK-77X
PU11433 A1 B1 C1 D1
AUDIO PWB ASS'Y
AUDIO PWB
PU11433-1-1
IC-1
IC-2
IC-3
IC-4
IC-5
IC-6
IC-7
P.B.(L)
P.B.(R)
REC. FM
BIAS LEVEL
NORMAL P.B. LEVEL
R54
REC FM LEVEL
R107
R PB LEVEL
R128
BIAS LEVEL
R120
NORMAL PB LEVEL

— UPPER DRUM —



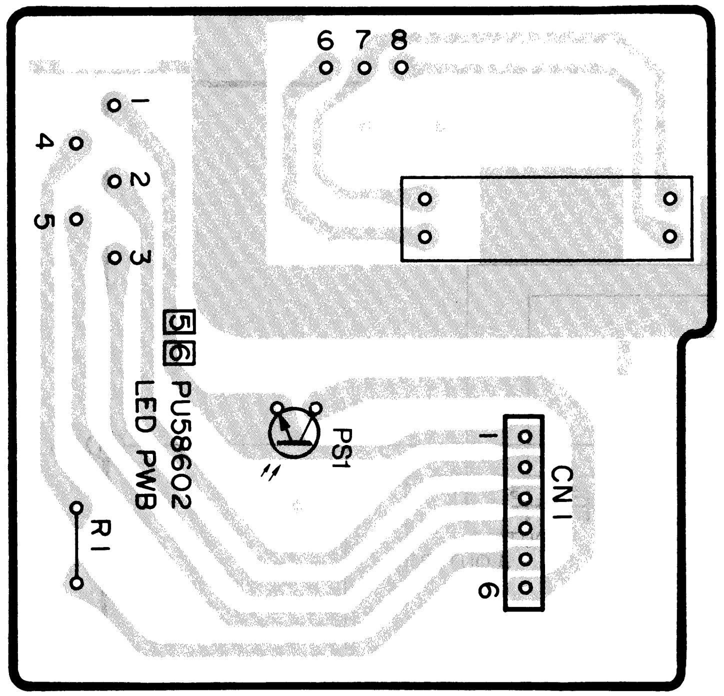
VIDEO HEAD (CH2)
FM AUDIO HEAD (CH2)
4 1
UPPER DRUM PWB
PDM3053
FM AUDIO HEAD (CH1)
VIDEO HEAD (CH1)

— A/CTL HEAD —



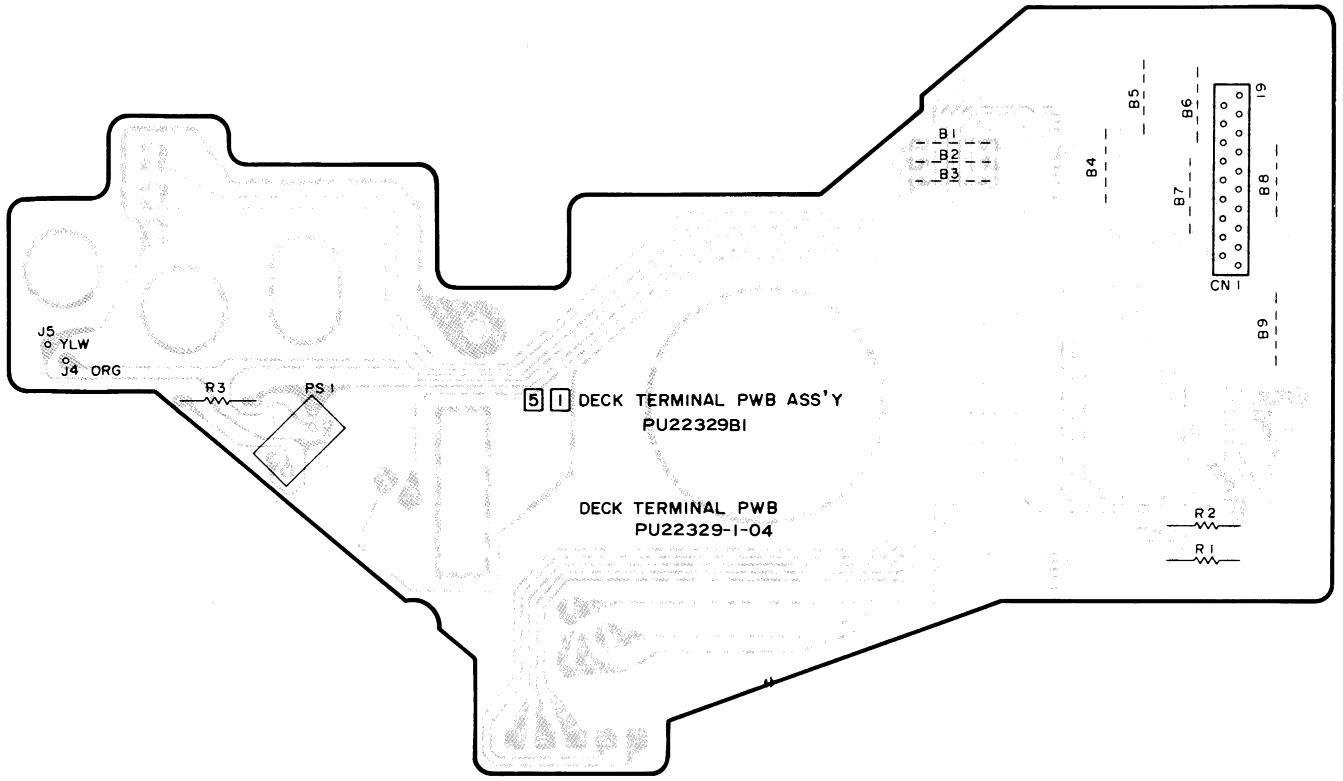
9
29
9
CN2
CN1
1 2 PU58016
A/CTL HEAD PWB
AUDIO R/P HEAD
AUDIO ERASE HEAD
CONTROL HEAD

– LED –



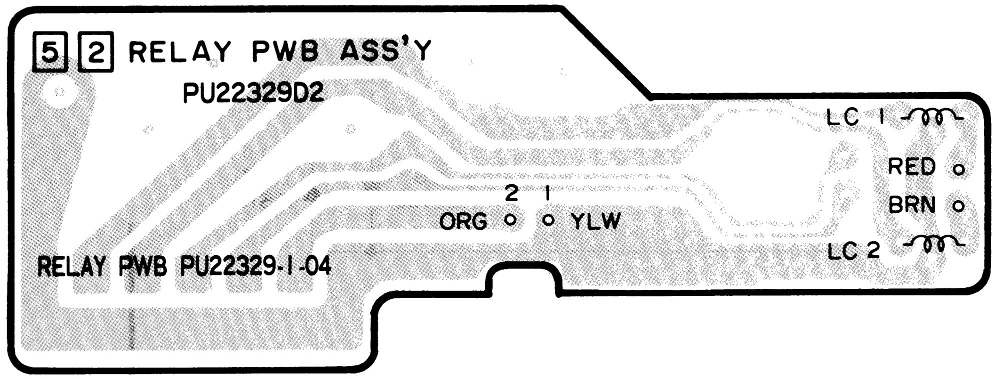
6 7 8
1
2
3
4
5
5 6 PU58602
LED PWB
PS1
CN1
1
6
R1

– DECK TERMINAL –



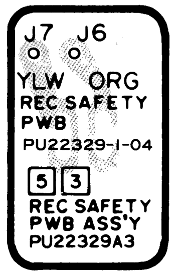
J5 YLW
J4 ORG
R3
PS1
5 1 DECK TERMINAL PWB ASS'Y
PU22329B1
DECK TERMINAL PWB
PU22329-1-04
B1
B2
B3
B4
B5
B6
B7
B8
B9
CN1
19
R2
R1

– RELAY –



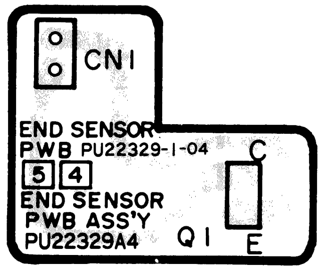
5 2 RELAY PWB ASS'Y
PU22329D2
LC 1
RED
BRN
LC 2
2 1
ORG
YLW
RELAY PWB PU22329-1-04

– REC SAFETY –



J7 J6
YLW ORG
REC SAFETY
PWB
PU22329-1-04
5 3
REC SAFETY
PWB ASS'Y
PU22329A3

– END SENSOR –

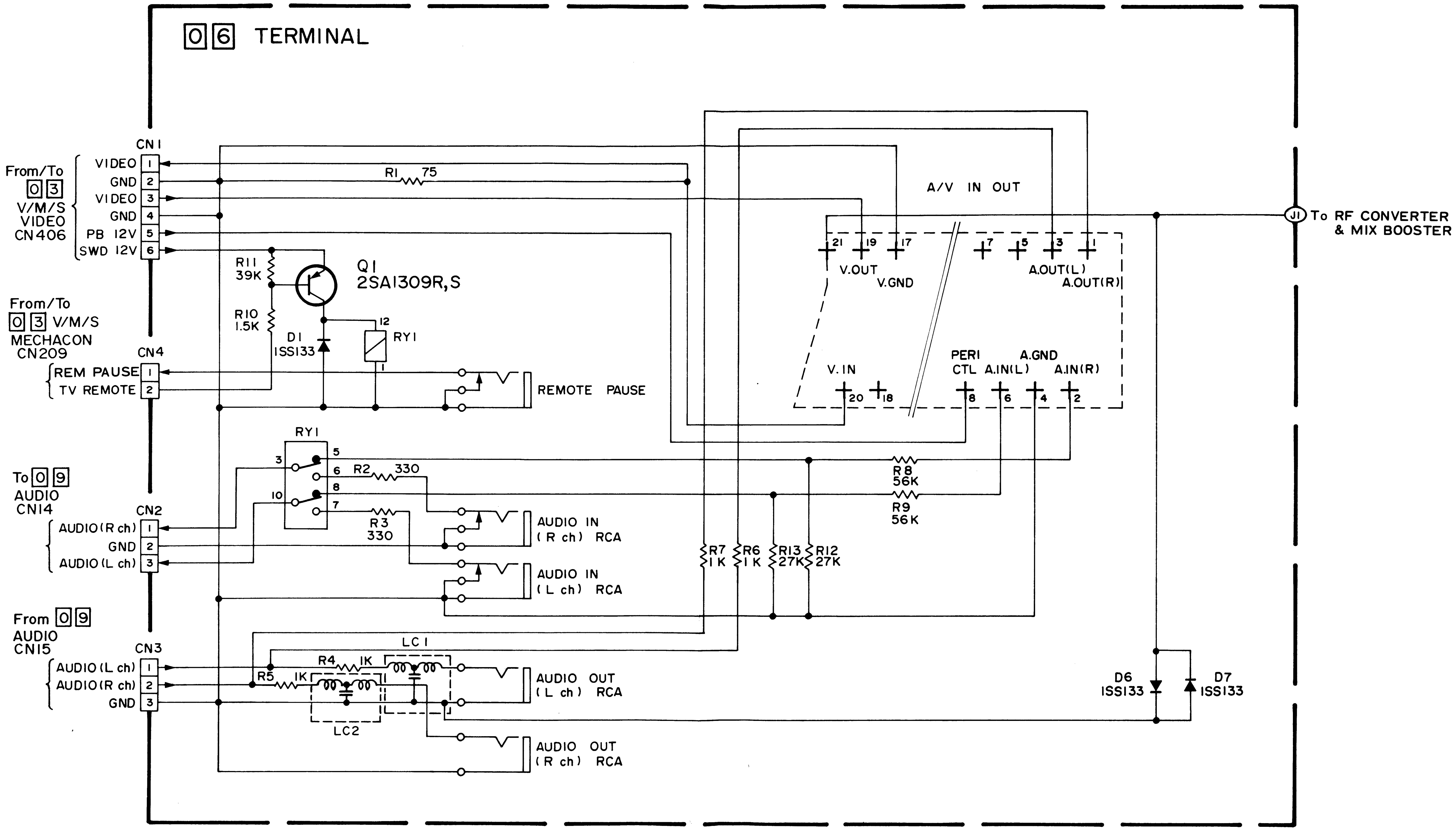


CN1
END SENSOR
PWB PU22329-1-04
5 4
END SENSOR
PWB ASS'Y
PU22329A4
Q1
C
E

6 5 4 3 2 1

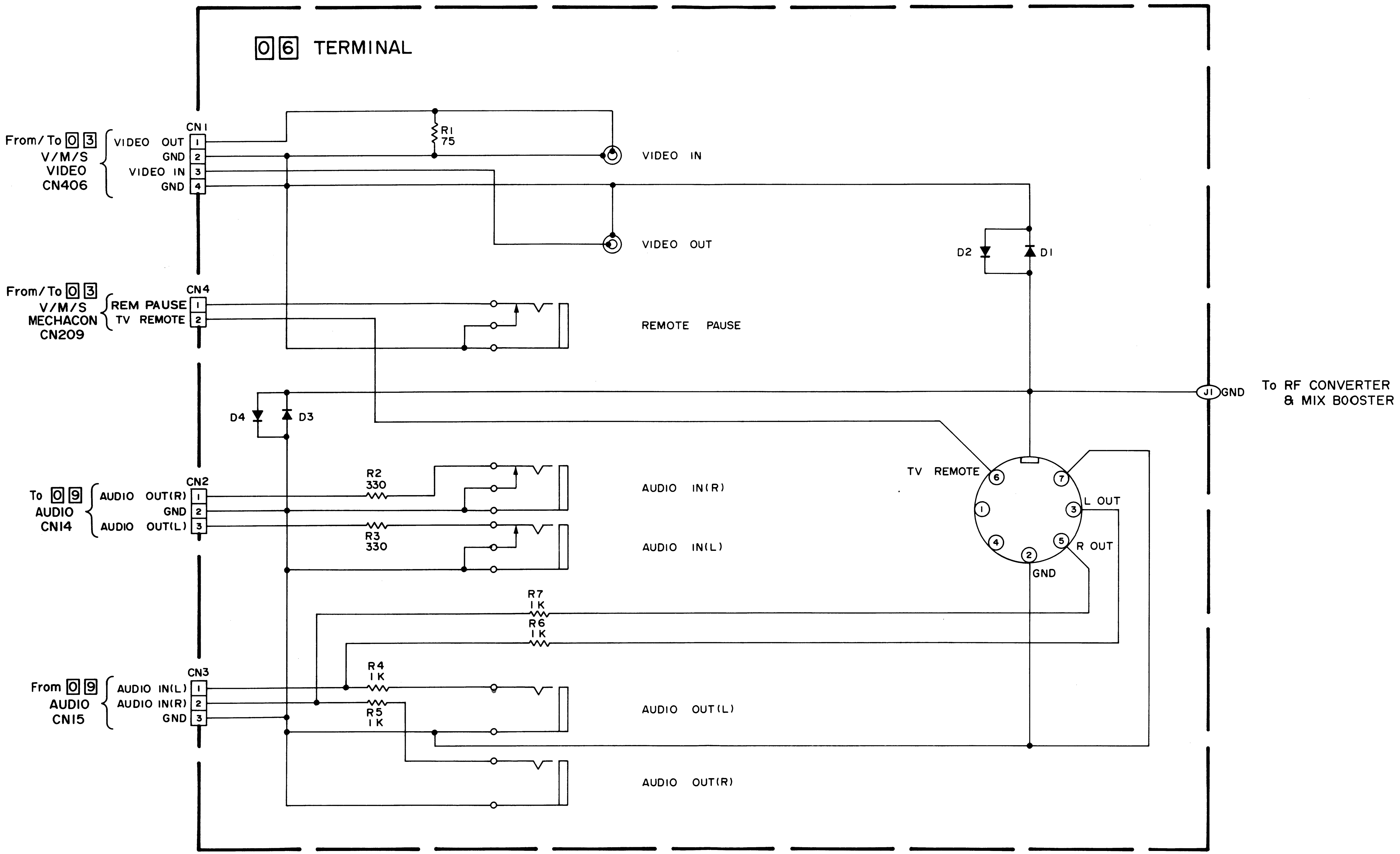
A B C E F G H

3.29 TERMINAL SCHEMATIC DIAGRAM (HR-D470E/EG)



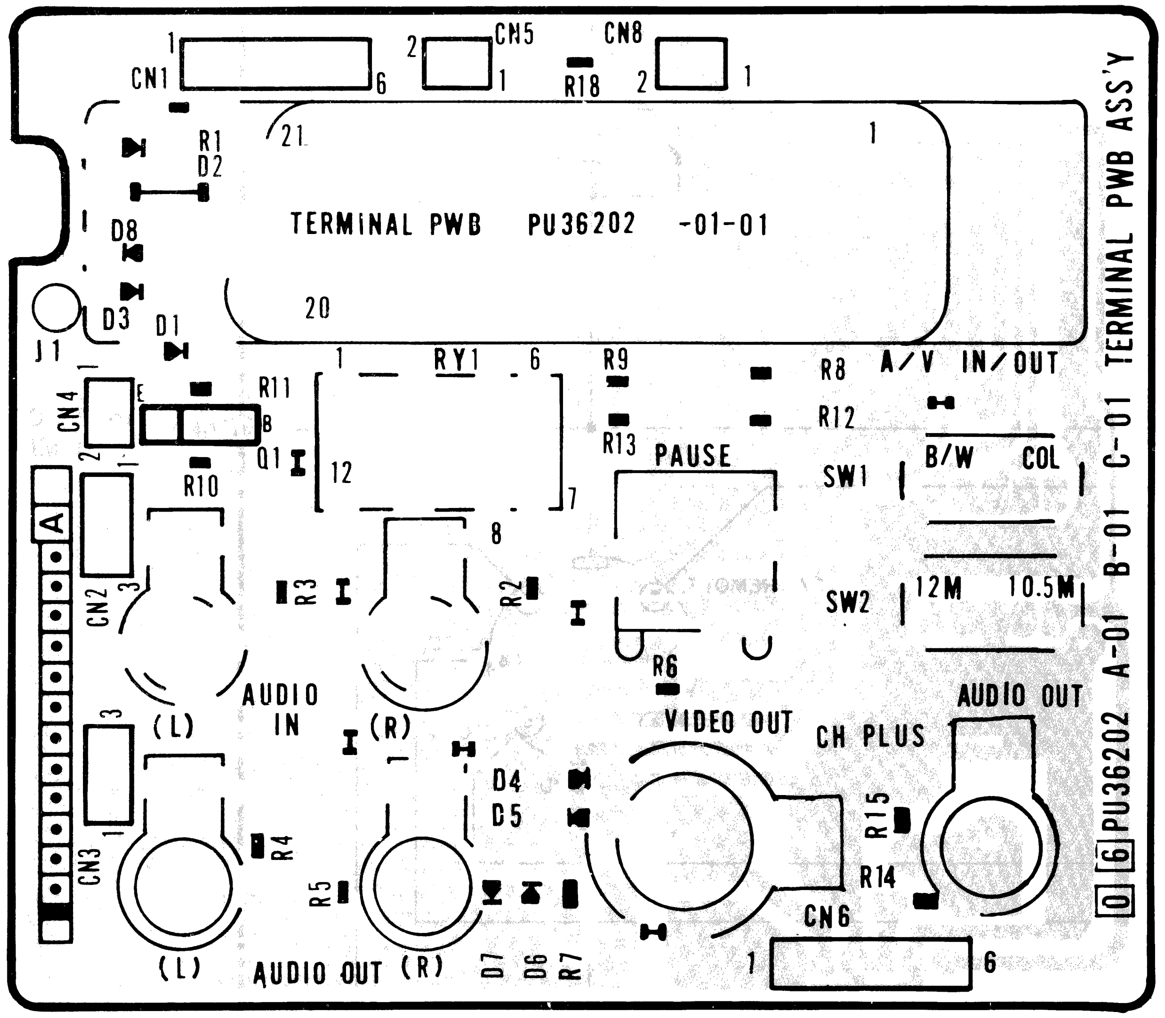
06 TERMINAL
CN1
From/To 03 V/M/S VIDEO CN406
VIDEO 1
GND 2
VIDEO 3
GND 4
PB 12V 5
SWD 12V 6
R1 75
R11 39K
R10 1.5K
Q1 2SA1309R,S
D1 1SS133
RY1
12
1
From/To 03 V/M/S MECHACON CN209
CN4
REM PAUSE 1
TV REMOTE 2
REMOTE PAUSE
RY1
3
5
6
8
10
7
R2 330
R3 330
To 09 AUDIO CN14
CN2
AUDIO (R ch) 1
GND 2
AUDIO (L ch) 3
AUDIO IN (R ch) RCA
AUDIO IN (L ch) RCA
From 09 AUDIO CN15
CN3
AUDIO (L ch) 1
AUDIO (R ch) 2
GND 3
R4 1K
R5 1K
LC1
LC2
AUDIO OUT (L ch) RCA
AUDIO OUT (R ch) RCA
A/V IN OUT
21
19
17
7
5
3
1
V.OUT
V.GND
A.OUT(L)
A.OUT(R)
V.IN
20
18
PERI CTL
8
A.IN(L)
6
A.GND
4
A.IN(R)
2
R8 56K
R9 56K
R7 1K
R6 1K
R13 27K
R12 27K
J1
To RF CONVERTER & MIX BOOSTER
D6 1SS133
D7 1SS133

3.30 TERMINAL SCHEMAITC DIAGRAM (HR-D470EK)

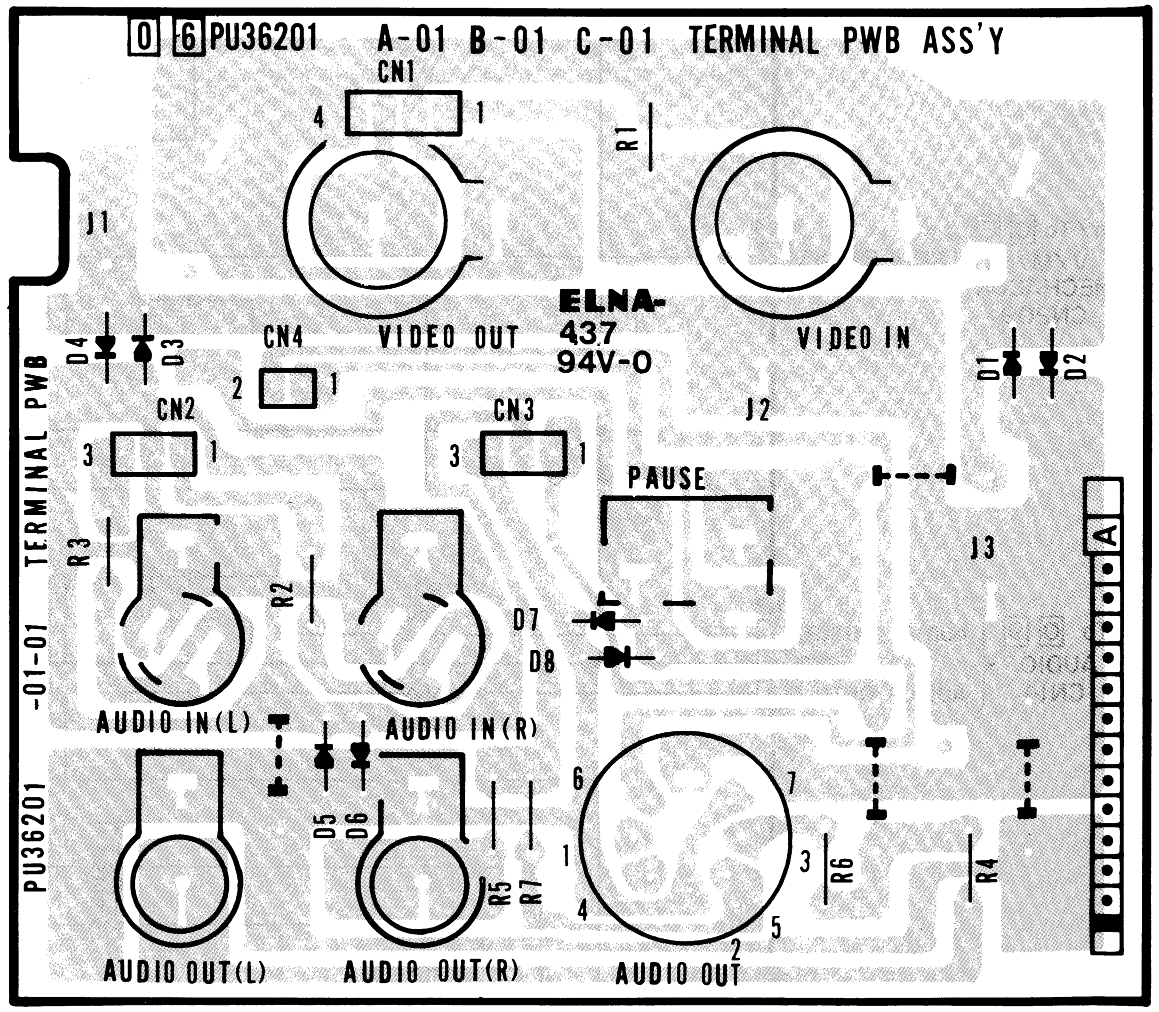

06 TERMINAL
From/To 03 V/M/S VIDEO CN406
CN1
VIDEO OUT 1
GND 2
VIDEO IN 3
GND 4
R1 75
VIDEO IN
VIDEO OUT
D2
D1
From/To 03 V/M/S MECHACON CN209
CN4
REM PAUSE 1
TV REMOTE 2
REMOTE PAUSE
D4
D3
J1 GND
To RF CONVERTER & MIX BOOSTER
To 09 AUDIO CN14
CN2
AUDIO OUT(R) 1
GND 2
AUDIO OUT(L) 3
R2 330
R3 330
AUDIO IN(R)
AUDIO IN(L)
TV REMOTE
L OUT
R OUT
GND
1
2
3
4
5
6
7
R7 1K
R6 1K
From 09 AUDIO CN15
CN3
AUDIO IN(L) 1
AUDIO IN(R) 2
GND 3
R4 1K
R5 1K
AUDIO OUT(L)
AUDIO OUT(R)

3.31 TERMINAL CIRCUIT BOARDS

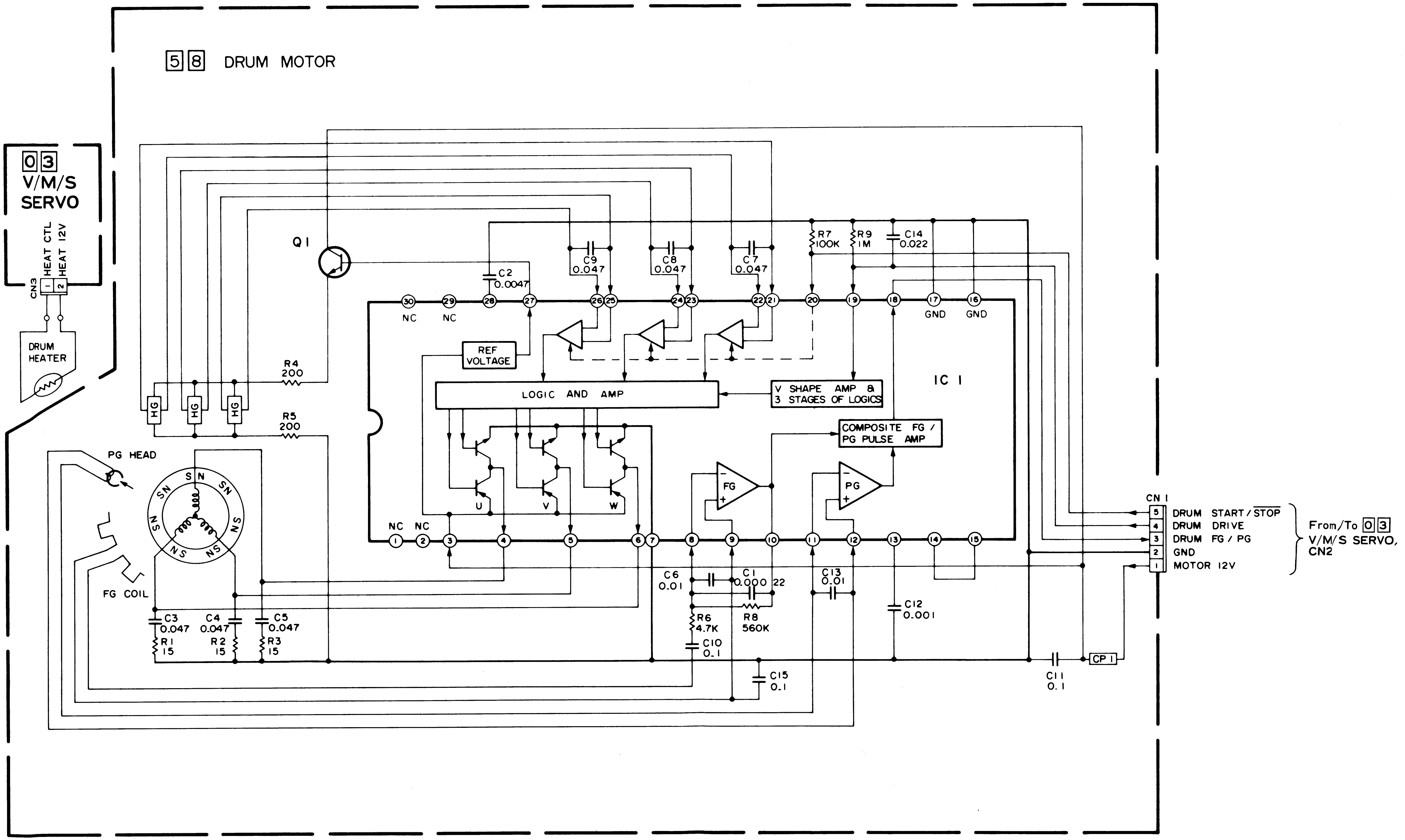
– HR-D470E/EG –


TERMINAL PWB ASS'Y
A-01 B-01 C-01 A/V IN/OUT
PU36202
0 6
TERMINAL PWB PU36202 -01-01
CN1
CN2
CN3
CN4
CN5
CN6
CN8
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R18
D1
D2
D3
D4
D5
D6
D7
D8
Q1
J1
RY1
PAUSE
SW1
B/W
COL
SW2
12M
10.5M
AUDIO IN
(L)
(R)
VIDEO OUT
CH PLUS
AUDIO OUT
(L) AUDIO OUT (R)
A

– HR-D470EK –


0 6 PU36201 A-01 B-01 C-01 TERMINAL PWB ASS'Y
TERMINAL PWB
PU36201 -01-01
CN1
CN2
CN3
CN4
R1
R2
R3
R4
R5
R6
R7
D1
D2
D3
D4
D5
D6
D7
D8
J1
J2
J3
VIDEO OUT
VIDEO IN
ELNA-
437
94V-0
PAUSE
AUDIO IN(L)
AUDIO IN(R)
AUDIO OUT(L)
AUDIO OUT(R)
AUDIO OUT
A

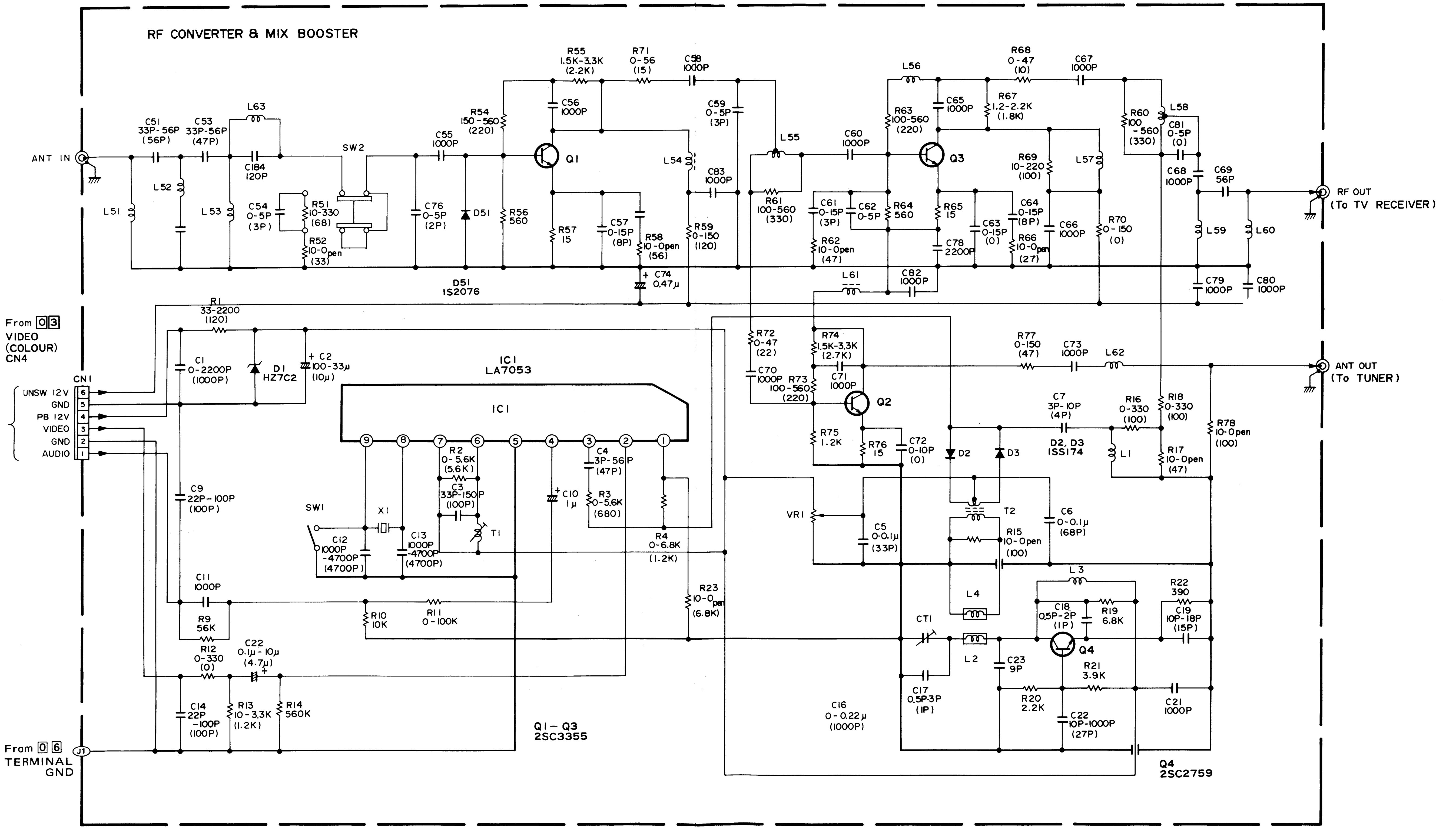
3.32 DRUM MOTOR SCHEMATIC DIAGRAM



58 DRUM MOTOR
03 V/M/S SERVO
CN3
HEAT CTL
HEAT 12V
DRUM HEATER
Q1
R4 200
R5 200
HG
HG
HG
PG HEAD
FG COIL
S N
C3 0.047
C4 0.047
C5 0.047
R1 15
R2 15
R3 15
C2 0.0047
C9 0.047
C8 0.047
C7 0.047
R7 100K
R9 1M
C14 0.022
NC
NC
GND
GND
REF VOLTAGE
LOGIC AND AMP
V SHAPE AMP & 3 STAGES OF LOGICS
IC 1
COMPOSITE FG / PG PULSE AMP
FG
PG
U
V
W
C6 0.01
C1 0.000 22
R6 4.7K
R8 560K
C10 0.1
C15 0.1
C13 0.01
C12 0.001
C11 0.1
CP 1
CN 1
DRUM START / STOP
DRUM DRIVE
DRUM FG / PG
GND
MOTOR 12V
From/To 03 V/M/S SERVO, CN2

3.33 RF CONVERTER AND MIX BOOSTER SCHEMATIC DIAGRAM (HR-D470E/EG)

NOTE:
1. **All parts shown in this schematic are critical for safety.**
2. **This schematic is only for reference.**
Avoid replacing individual parts.
Replace the entire unit only.


RF CONVERTER & MIX BOOSTER
ANT IN
From 03 VIDEO (COLOUR) CN4
CN1
UNSW 12V 6
GND 5
PB 12V 4
VIDEO 3
GND 2
AUDIO 1
From 06 TERMINAL GND
J1
RF OUT (To TV RECEIVER)
ANT OUT (To TUNER)
C51 33P-56P (56P)
C53 33P-56P (47P)
L63
C184 120P
SW2
L51
L52
L53
C54 0-5P (3P)
R51 10-330 (68)
R52 10-Open (33)
C55 1000P
C76 0-5P (2P)
D51
D51 1S2076
R54 150-560 (220)
R56 560
R55 1.5K-3.3K (2.2K)
R71 0-56 (15)
C58 1000P
C56 1000P
Q1
R57 15
C57 0-15P (8P)
R58 10-Open (56)
C74 0.47µ
L54
C59 0-5P (3P)
C83 1000P
R59 0-150 (120)
L55
R61 100-560 (330)
L56
C60 1000P
R63 100-560 (220)
C65 1000P
Q3
C61 0-15P (3P)
C62 0-5P
R64 560
R62 10-Open (47)
R65 15
C78 2200P
C63 0-15P (0)
R68 0-47 (10)
C67 1000P
R67 1.2-2.2K (1.8K)
R69 10-220 (100)
L57
C64 0-15P (8P)
R66 10-Open (27)
C66 1000P
R70 0-150 (0)
R60 100-560 (330)
L58
C81 0-5P (0)
C68 1000P
C69 56P
L59
L60
C79 1000P
C80 1000P
L61
C82 1000P
R1 33-2200 (120)
C1 0-2200P (1000P)
D1 HZ7C2
C2 100-33µ (10µ)
IC1 LA7053
IC1
9 8 7 6 5 4 3 2 1
R2 0-5.6K (5.6K)
C3 33P-150P (100P)
T1
C4 3P-56P (47P)
R3 0-5.6K (680)
C10 1µ
R4 0-6.8K (1.2K)
C9 22P-100P (100P)
SW1
X1
C12 1000P -4700P (4700P)
C13 1000P -4700P (4700P)
C11 1000P
R9 56K
R10 10K
R11 0-100K
R12 0-330 (0)
C22 0.1µ-10µ (4.7µ)
C14 22P -100P (100P)
R13 10-3.3K (1.2K)
R14 560K
Q1-Q3 2SC3355
R23 10-Open (6.8K)
R72 0-47 (22)
C70 1000P
R73 100-560 (220)
R74 1.5K-3.3K (2.7K)
C71 1000P
Q2
R75 1.2K
R76 15
C72 0-10P (0)
VR1
C5 0-0.1µ (33P)
D2
D3
D2, D3 1SS174
T2
R15 10-Open (100)
C6 0-0.1µ (68P)
R77 0-150 (47)
C73 1000P
L62
C7 3P-10P (4P)
R16 0-330 (100)
R18 0-330 (100)
L1
R17 10-Open (47)
R78 10-Open (100)
L3
L4
CT1
L2
C23 9P
C18 0.5P-2P (1P)
R19 6.8K
Q4
R22 390
C19 10P-18P (15P)
R21 3.9K
R20 2.2K
C21 1000P
C17 0.5P-3P (1P)
C16 0-0.22µ (1000P)
C22 10P-1000P (27P)
Q4 2SC2759

6

3.34 RF CONVERTER AND MIX BOOSTER SCHEMATIC DIAGRAM (HR-D470EK)

NOTE:
1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
Avoid replacing individual parts.
Replace the entire unit only.

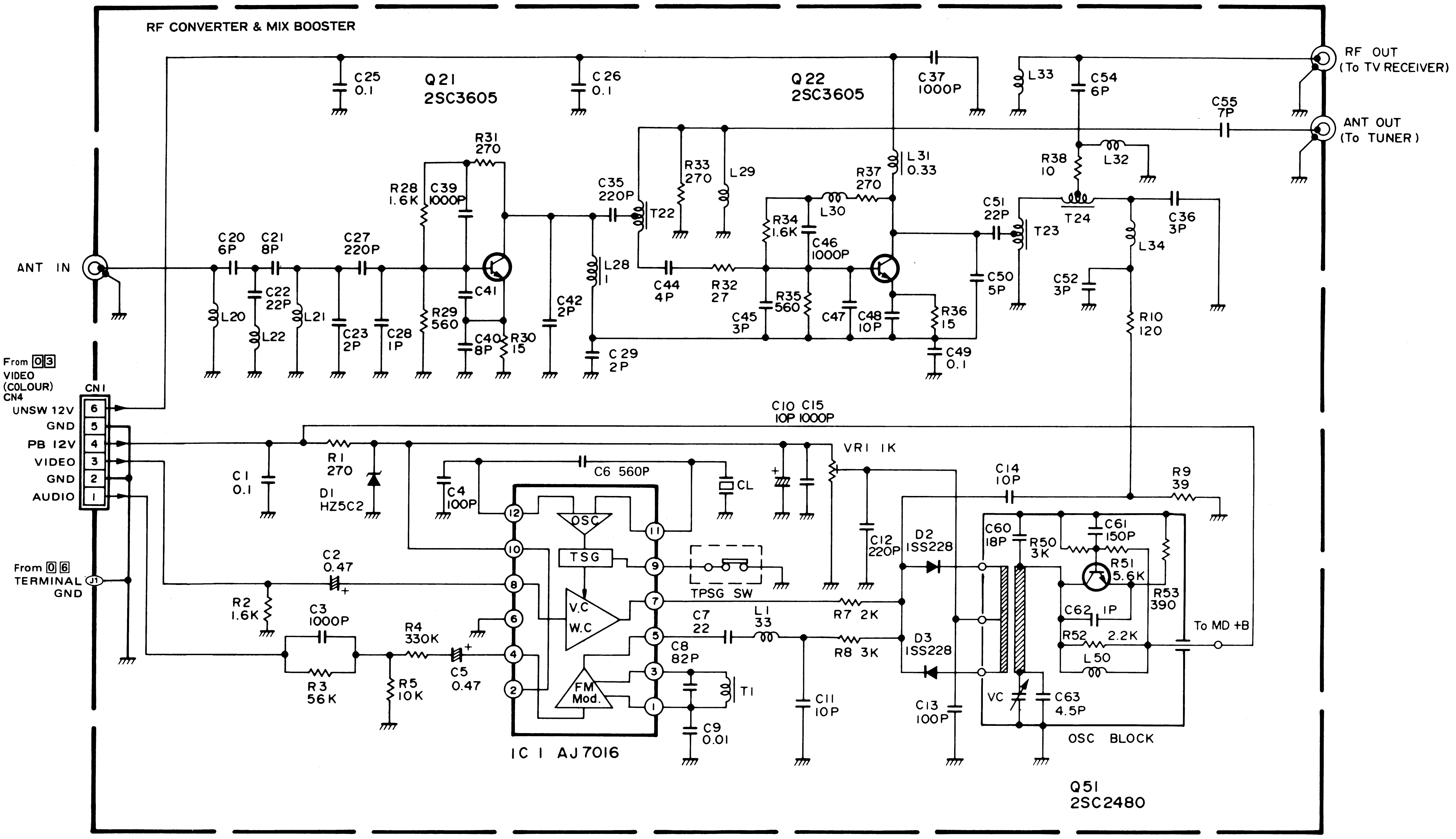
5

4

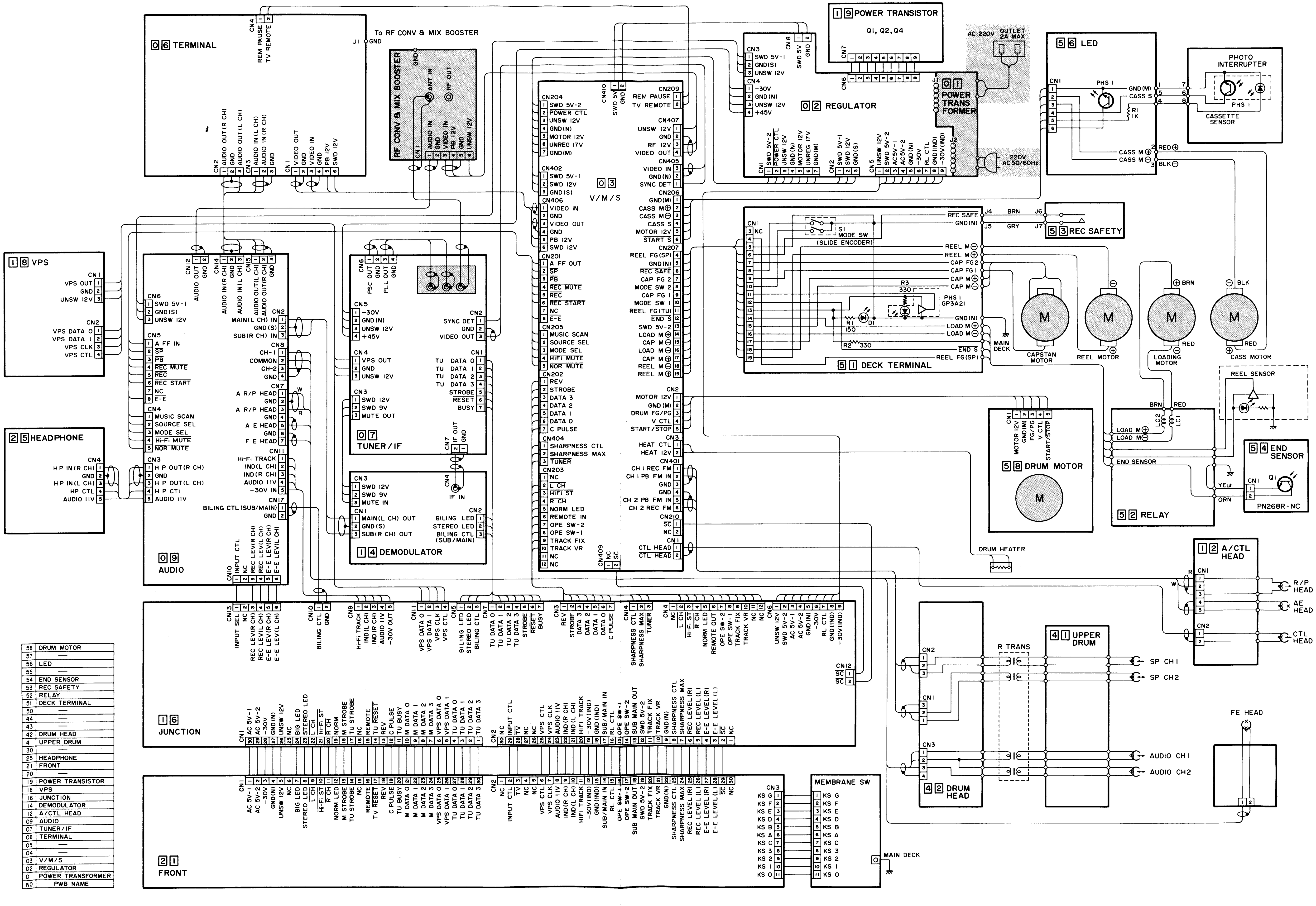
3

2

1

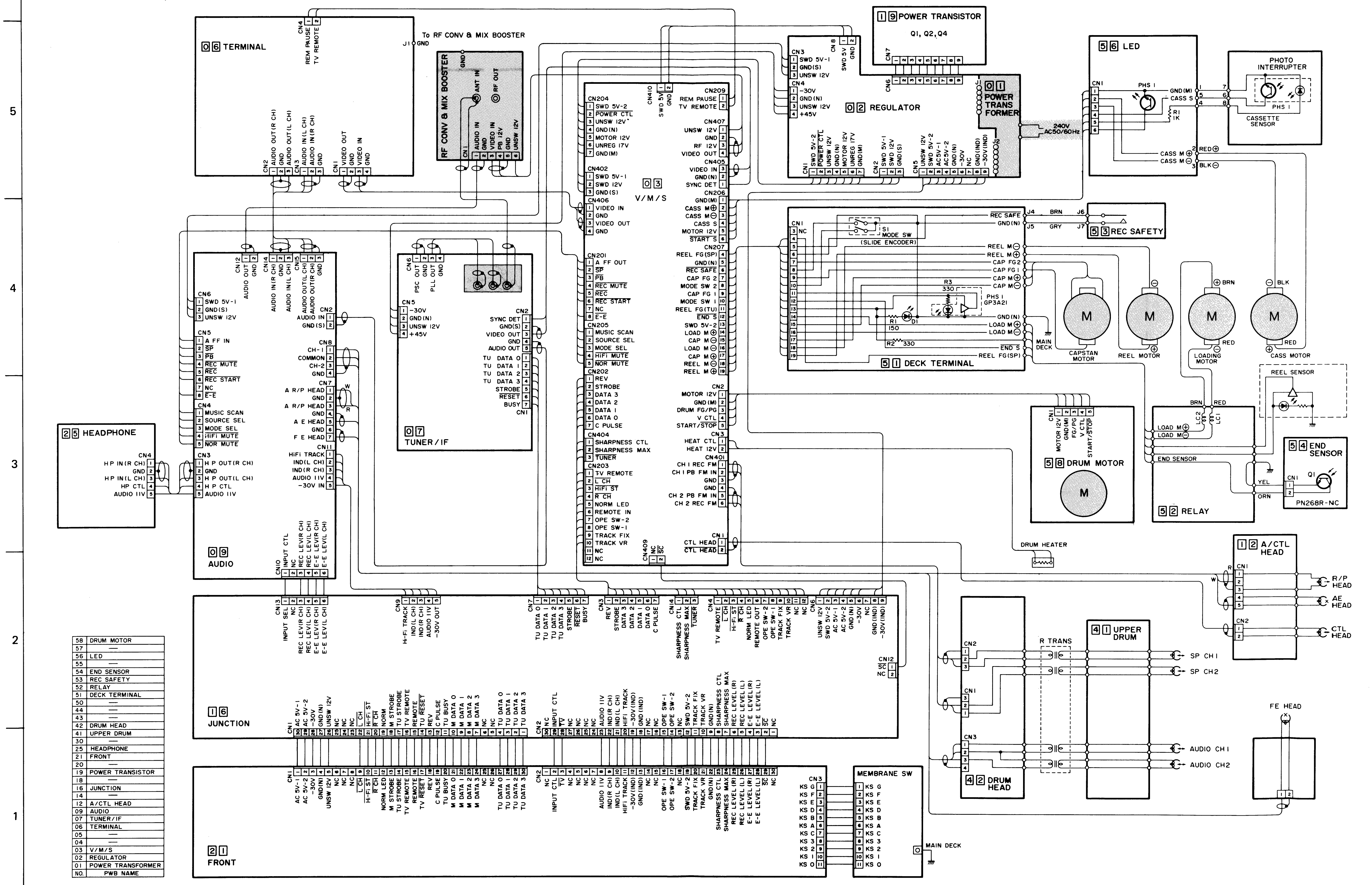

RF CONVERTER & MIX BOOSTER
ANT IN
RF OUT (To TV RECEIVER)
ANT OUT (To TUNER)
Q21 2SC3605
Q22 2SC3605
Q51 2SC2480
C25 0.1
C26 0.1
C37 1000P
L33
C54 6P
C55 7P
R31 270
R28 1.6K
C39 1000P
C35 220P
T22
R33 270
L29
L31 0.33
R37 270
R38 10
L32
T24
C36 3P
C51 22P
T23
L34
C20 6P
C21 8P
C27 220P
R34 1.6K
L30
C46 1000P
L28 1
C44 4P
R32 27
C22 22P
L20
L21
L22
C23 2P
C28 1P
R29 560
C41
C40 8P
R30 15
C42 2P
C29 2P
R35 560
C45 3P
C47
C48 10P
R36 15
C49 0.1
C50 5P
C52 3P
R10 120
From 03
VIDEO (COLOUR) CN4
CN1
UNSW 12V 6
GND 5
PB 12V 4
VIDEO 3
GND 2
AUDIO 1
From 06
TERMINAL J1
GND
C10 C15
10P 1000P
VR1 1K
C1 0.1
R1 270
D1 HZ5C2
C6 560P
C4 100P
CL
C14 10P
R9 39
C12 220P
D2 1SS228
C60 18P
R50 3K
C61 150P
R51 5.6K
R53 390
TSG
OSC
TPSG SW
C2 0.47
R2 1.6K
C3 1000P
R4 330K
R3 56K
R5 10K
C5 0.47
V.C
W.C
FM Mod.
C7 22
L1 33
R7 2K
R8 3K
C8 82P
D3 1SS228
C62 1P
R52 2.2K
L50
To MD +B
T1
C11 10P
C9 0.01
C13 100P
VC
C63 4.5P
OSC BLOCK
IC 1 AJ7016
12 11 10 9 8 7 6 5 4 3 2 1

3.35 OVERALL WIRING (HR-D470E/EG)


06 TERMINAL
To RF CONV & MIX BOOSTER
RF CONV & MIX BOOSTER
ANT IN
RF OUT
19 POWER TRANSISTOR
Q1, Q2, Q4
AC 220V
OUTLET 2A MAX
01 POWER TRANS FORMER
02 REGULATOR
220V AC50/60Hz
56 LED
PHOTO INTERRUPTER
CASSETTE SENSOR
PHS 1
03 V/M/S
18 VPS
25 HEADPHONE
09 AUDIO
07 TUNER/IF
14 DEMODULATOR
51 DECK TERMINAL
S1 MODE SW (SLIDE ENCODER)
PHS 1 GP3A21
53 REC SAFETY
CAPSTAN MOTOR
REEL MOTOR
LOADING MOTOR
CASS MOTOR
MAIN DECK
58 DRUM MOTOR
52 RELAY
REEL SENSOR
54 END SENSOR
PN268R-NC
DRUM HEATER
12 A/CTL HEAD
R/P HEAD
AE HEAD
CTL HEAD
R TRANS
41 UPPER DRUM
SP CH1
SP CH2
AUDIO CH1
AUDIO CH2
42 DRUM HEAD
FE HEAD
16 JUNCTION
21 FRONT
MEMBRANE SW
A
B
C
D
E
F
G
H
1
2
3
4
5
6

NO.	PWB NAME
58	DRUM MOTOR
57	—
56	LED
55	—
54	END SENSOR
53	REC SAFETY
52	RELAY
51	DECK TERMINAL
50	—
44	—
43	—
42	DRUM HEAD
41	UPPER DRUM
30	—
25	HEADPHONE
21	FRONT
20	—
19	POWER TRANSISTOR
18	VPS
16	JUNCTION
14	DEMODULATOR
12	A/CTL HEAD
09	AUDIO
07	TUNER/IF
06	TERMINAL
05	—
04	—
03	V/M/S
02	REGULATOR
01	POWER TRANSFORMER

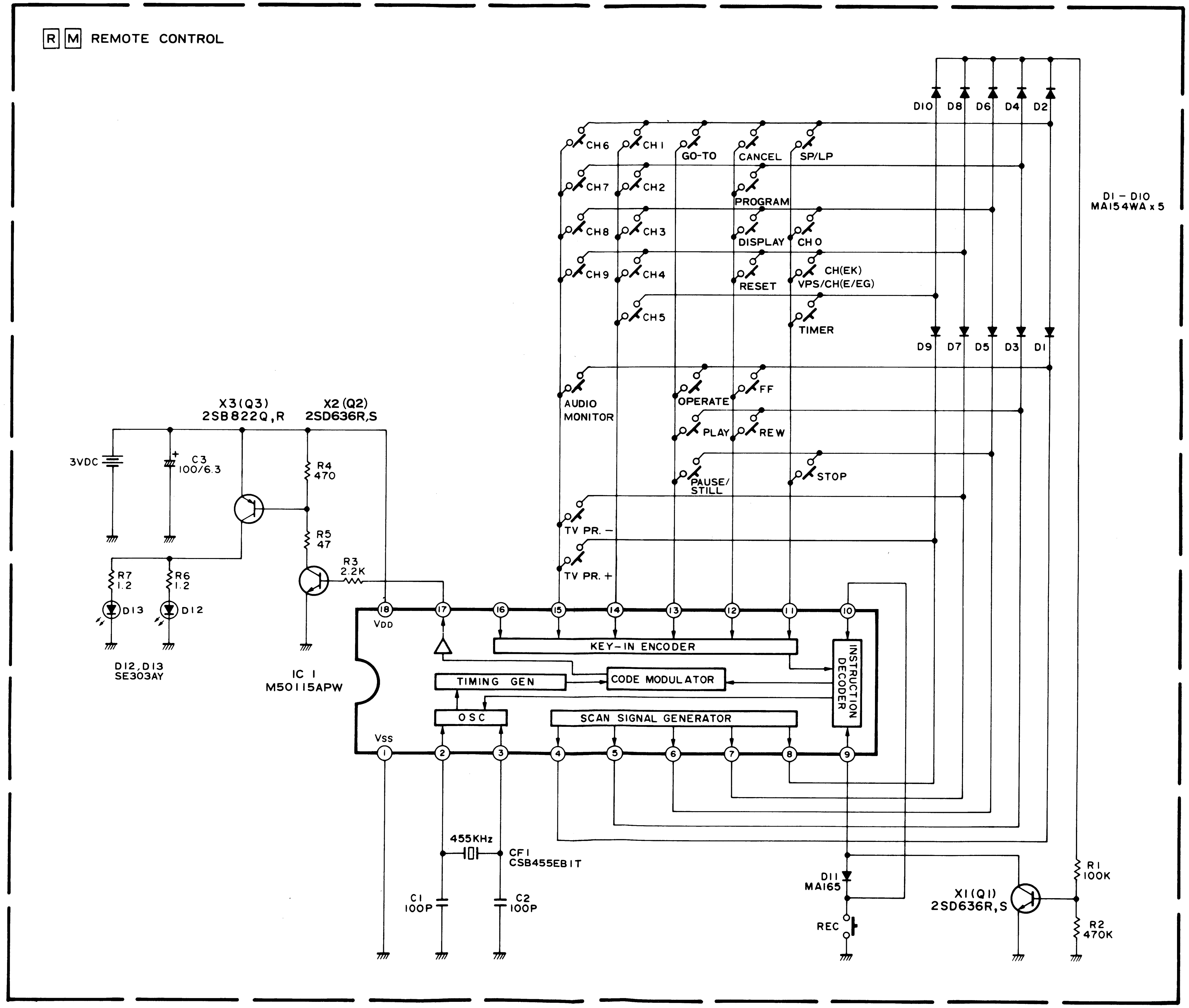
3.36 OVERALL WIRING (HR-D470EK)


06 TERMINAL
To RF CONV & MIX BOOSTER
RF CONV & MIX BOOSTER
19 POWER TRANSISTOR
Q1, Q2, Q4
01 POWER TRANS FORMER
02 REGULATOR
240V AC50/60Hz
56 LED
PHOTO INTERRUPTER
CASSETTE SENSOR
03 V/M/S
53 REC SAFETY
51 DECK TERMINAL
S1 MODE SW (SLIDE ENCODER)
CAPSTAN MOTOR
REEL MOTOR
LOADING MOTOR
CASS MOTOR
REEL SENSOR
MAIN DECK
25 HEADPHONE
09 AUDIO
07 TUNER/IF
58 DRUM MOTOR
52 RELAY
54 END SENSOR
PN268R-NC
DRUM HEATER
12 A/CTL HEAD
R/P HEAD
AE HEAD
CTL HEAD
16 JUNCTION
R TRANS
41 UPPER DRUM
SP CH1
SP CH2
42 DRUM HEAD
AUDIO CH1
AUDIO CH2
FE HEAD
21 FRONT
MEMBRANE SW
A
B
C
D
E
F
G
H
1
2
3
4
5
6

58	DRUM MOTOR
57	—
56	LED
55	—
54	END SENSOR
53	REC SAFETY
52	RELAY
51	DECK TERMINAL
50	—
44	—
43	—
42	DRUM HEAD
41	UPPER DRUM
30	—
25	HEADPHONE
21	FRONT
20	—
19	POWER TRANSISTOR
18	—
16	JUNCTION
14	—
12	A/CTL HEAD
09	AUDIO
07	TUNER/IF
06	TERMINAL
05	—
04	—
03	V/M/S
02	REGULATOR
01	POWER TRANSFORMER
NO.	PWB NAME

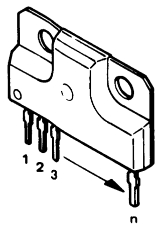
3.37 REMOTE CONTROL SCHEMATIC DIAGRAM

NOTE:
All parts shown in this schematic are critical for safety.
Replace only with specified part numbers.

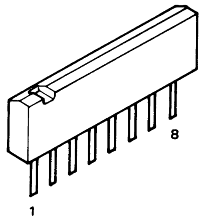

R M REMOTE CONTROL
D10 D8 D6 D4 D2
D9 D7 D5 D3 D1
D1 - D10
MA154WA x 5
CH6
CH1
GO-TO
CANCEL
SP/LP
CH7
CH2
PROGRAM
CH8
CH3
DISPLAY
CH 0
CH9
CH4
RESET
CH(EK)
VPS/CH(E/EG)
CH5
TIMER
AUDIO
MONITOR
OPERATE
FF
PLAY
REW
PAUSE/
STILL
STOP
TV PR. −
TV PR. +
X3(Q3)
2SB822Q,R
X2(Q2)
2SD636R,S
3VDC
C3
100/6.3
R4
470
R5
47
R3
2.2K
R7
1.2
R6
1.2
D13
D12
D12, D13
SE303AY
IC 1
M50115APW
VDD
VSS
KEY-IN ENCODER
INSTRUCTION DECODER
CODE MODULATOR
TIMING GEN
OSC
SCAN SIGNAL GENERATOR
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
455KHz
CF1
CSB455EB1T
C1
100P
C2
100P
D11
MA165
REC
X1(Q1)
2SD636R,S
R1
100K
R2
470K

3.38 SEMICONDUCTOR SHAPES

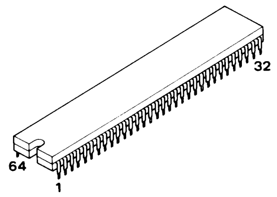
M54644BL
M54644AL



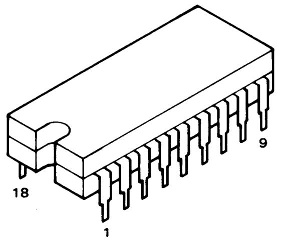
BA7007



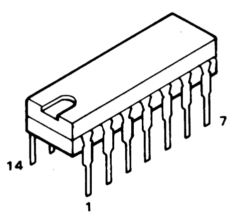
UPD75208CW-030
M50965-611SP



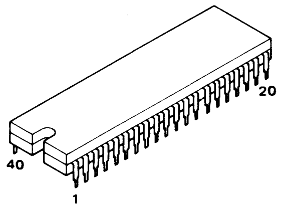
M50115APW



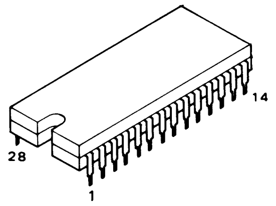
M5224P
BA6405
M58655P



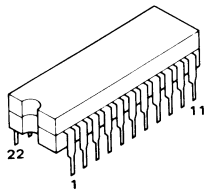
MSC1124BRS



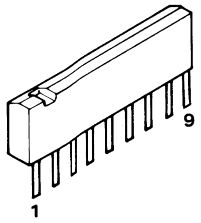
TDA3800GS



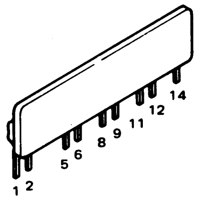
AN3994NK
AN3926K



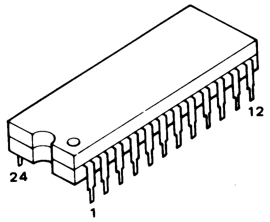
BA3707



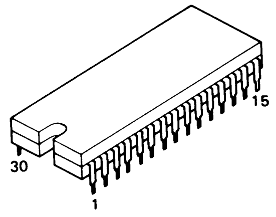
H8D1951A


14
12
11
9
8
6
5
2
1

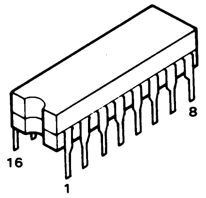
UPD92C43CY



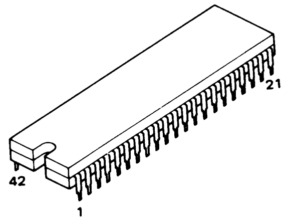
HD49703NT
M50440-394SP
M51365SP
HA11870NT



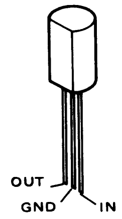
HA11752
TA8400P



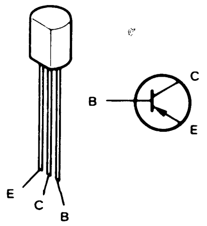
AN6299K
AN3990K
VC2023B



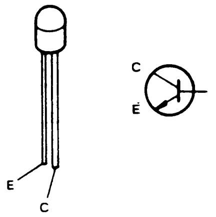
M5278L05
S-8053HLB
M5278L56



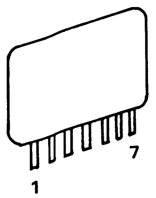
2SA1020O,Y



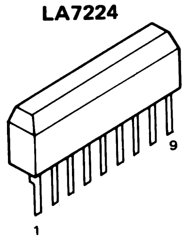
PN268R-NC



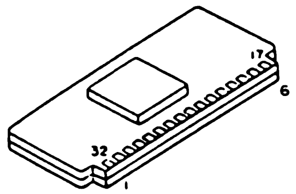
H8D7013
7VT12



LA7225
LA7224



PU22046A



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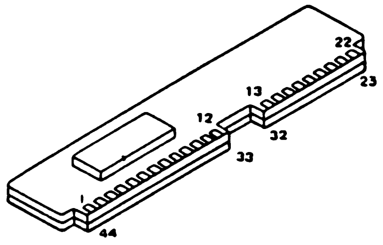
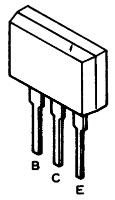
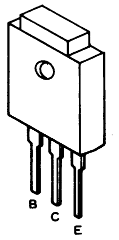

22
23
13
12
32
33
1
44

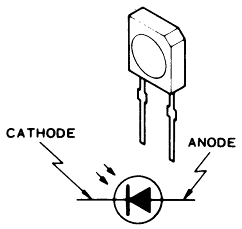
2SB851R,S



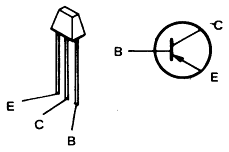
2SD1740-01



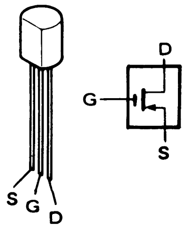
PD49PI


CATHODE
ANODE

2SA933
2A854
2SA1309



2SK656



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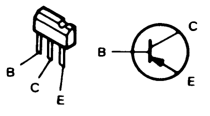
2SB851
2SB810
2SB641
2SB643



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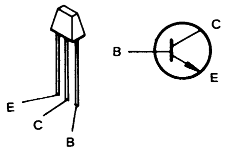
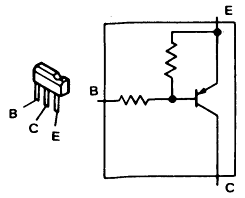
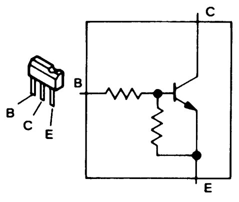
2SC3327



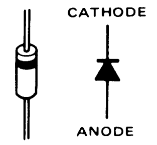
DTA143
DTA114
DTA124
DTA144



DTC144
DTC124

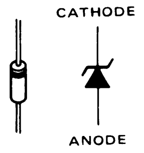


E-452-2
S5688G
11E2
1SS132
MA27TA
10E2
1SS133
MA165
OA90

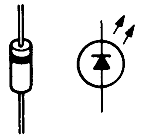

CATHODE
ANODE

RD8.2EB3
HZ12C1
HZ15-2
HZ4A2
HZ6C2
HZS4.3EB2
HZ30-2
RD7.5ES-R1B1
RD6.2ES-T1B1

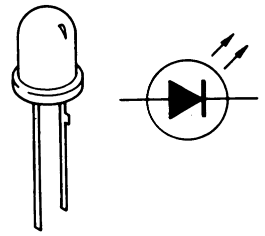
MTZ6.8B
MTZ10A
MTZ5.1C
HZ24-2L
RD5.6ES-T1B1
MTZ10B
MTZ7.5B
MTZ12B
RD9.1ES-T1B2


CATHODE
ANODE

SE303AY



SLP-981C-50



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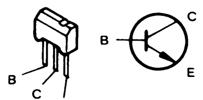
2SD637
2SD636
2SC2021



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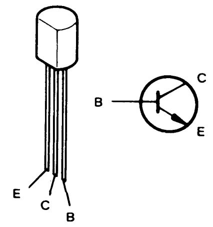
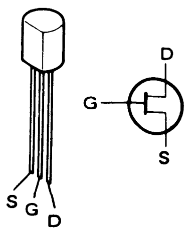
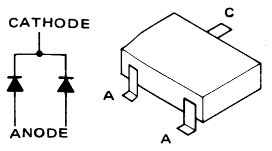
2SD1292
2SC2655
2SC1685



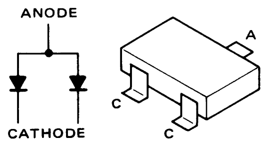
2SK381



DAN209S


CATHODE
ANODE
C
A
A

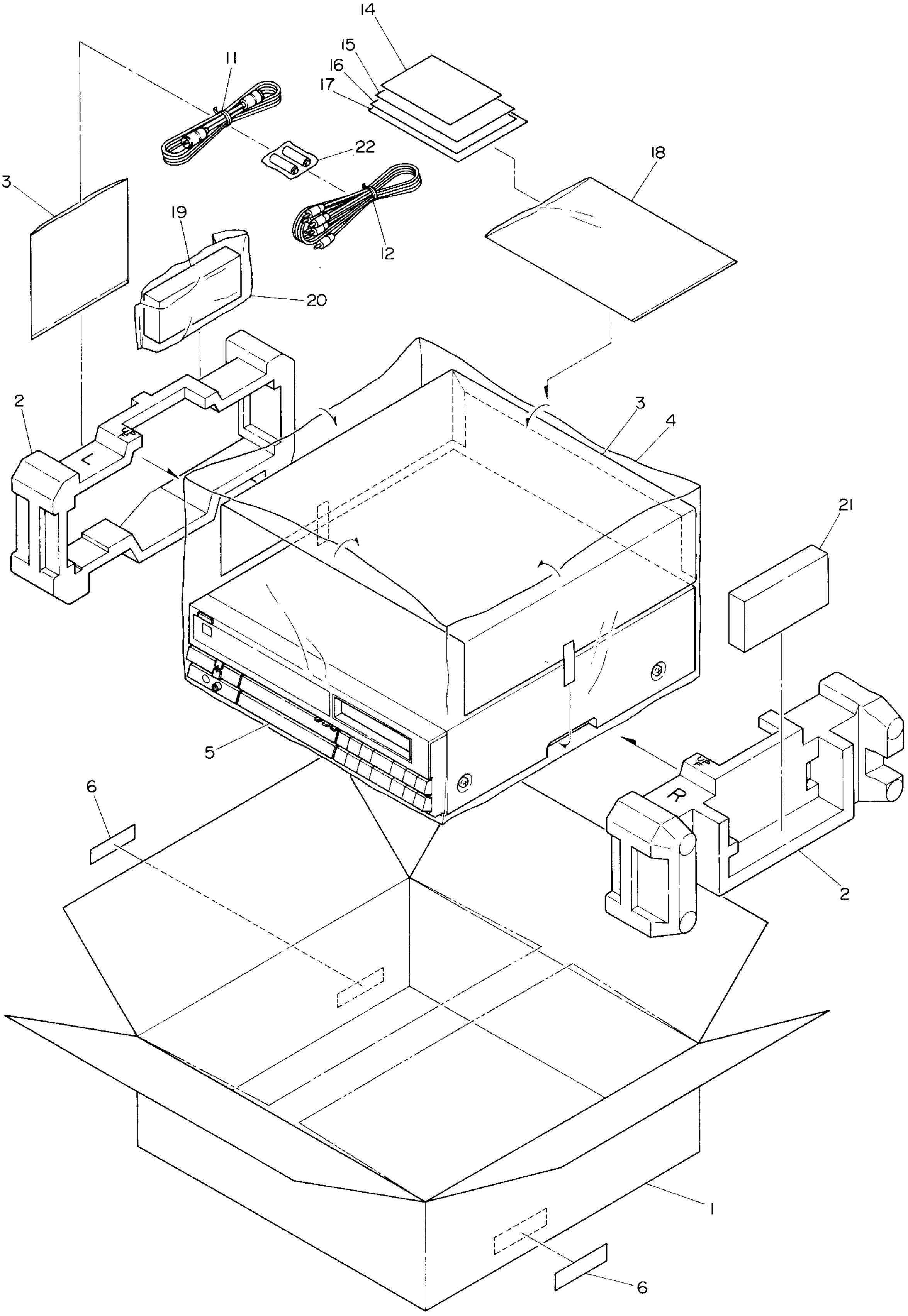
MA154WA


ANODE
CATHODE
A
C
C

3-39

SECTION 4
EXPLODED VIEWS

4.1 PACKING ASSEMBLY [M1]



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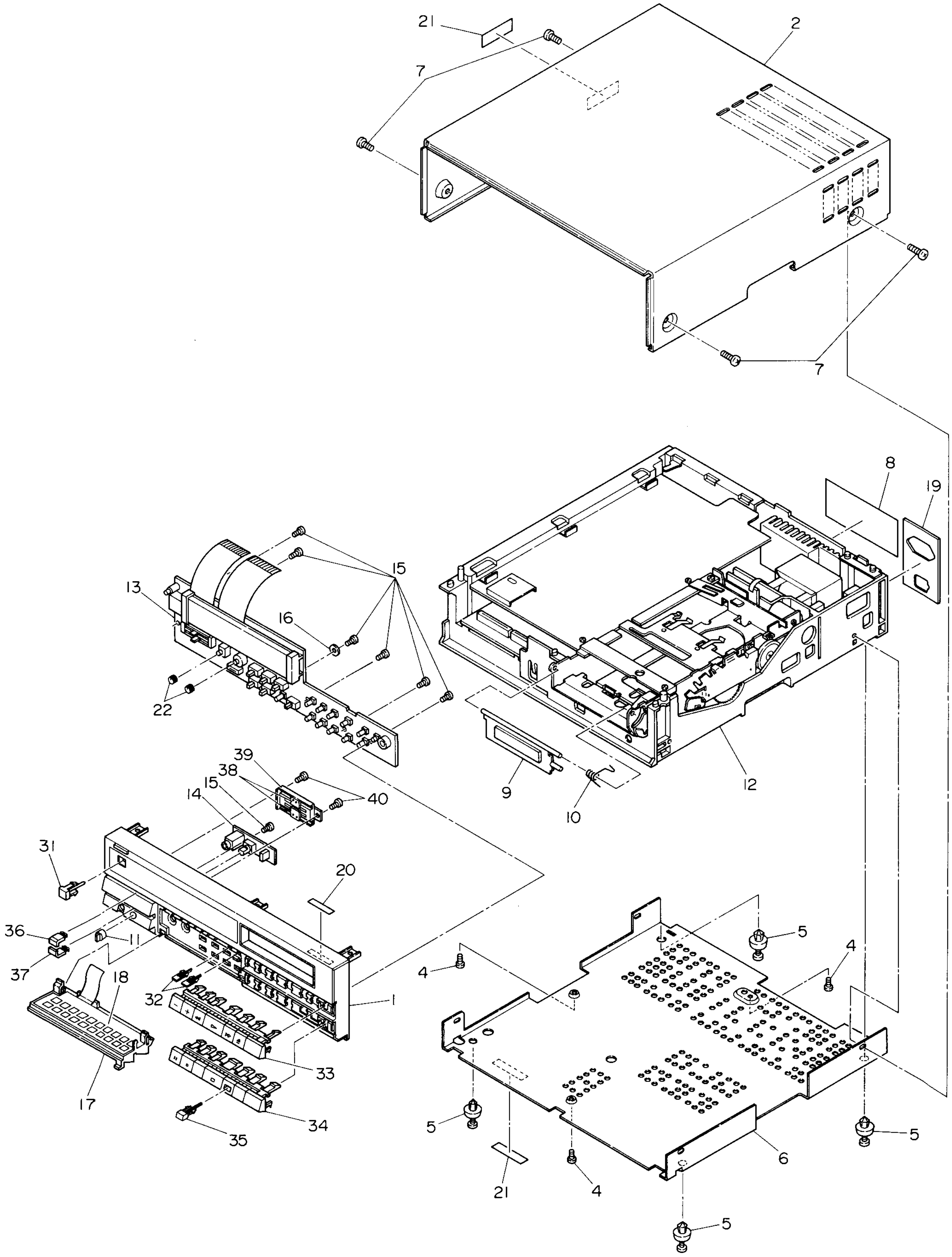
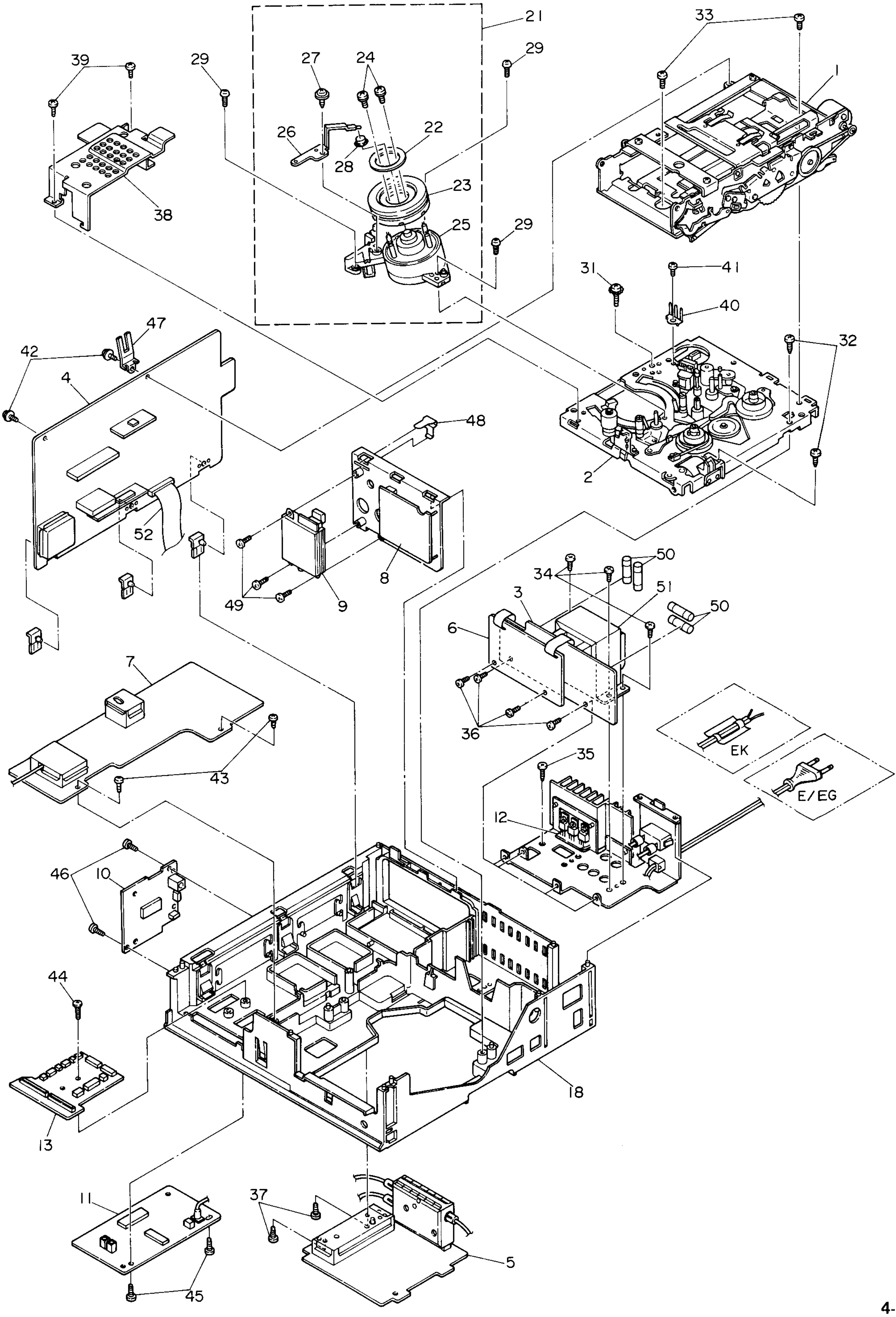
6
2
1
6
L
R

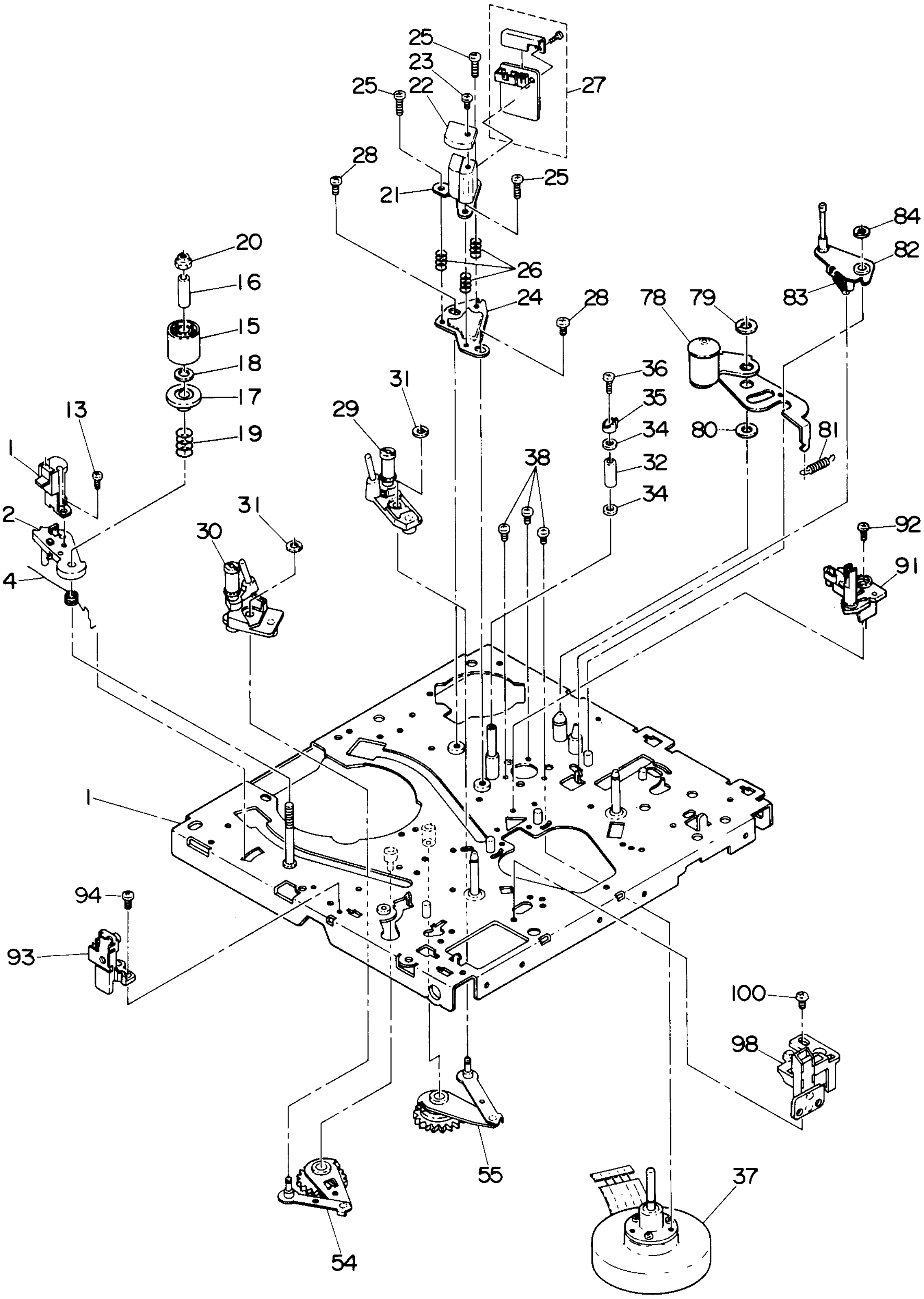
4.2 CABINET ASSEMBLY [M2]


21
2
7
7
8
19
13
15
16
22
39
38
15
14
40
9
10
12
31
20
36
37
11
18
32
1
33
17
34
35
5
4
4
5
5
6
21
4
5

4.3 CHASSIS ASSEMBLY [M3]


21
29
39
29
27
24
33
1
26
22
28
23
38
25
29
31
41
40
47
42
4
32
48
2
52
50
34
3
51
49
9
8
6
50
36
7
43
EK
E/EG
35
12
46
10
44
18
13
11
37
5
45

4.4 MECHANISM ASSEMBLY [M4] -1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23
25
22
27
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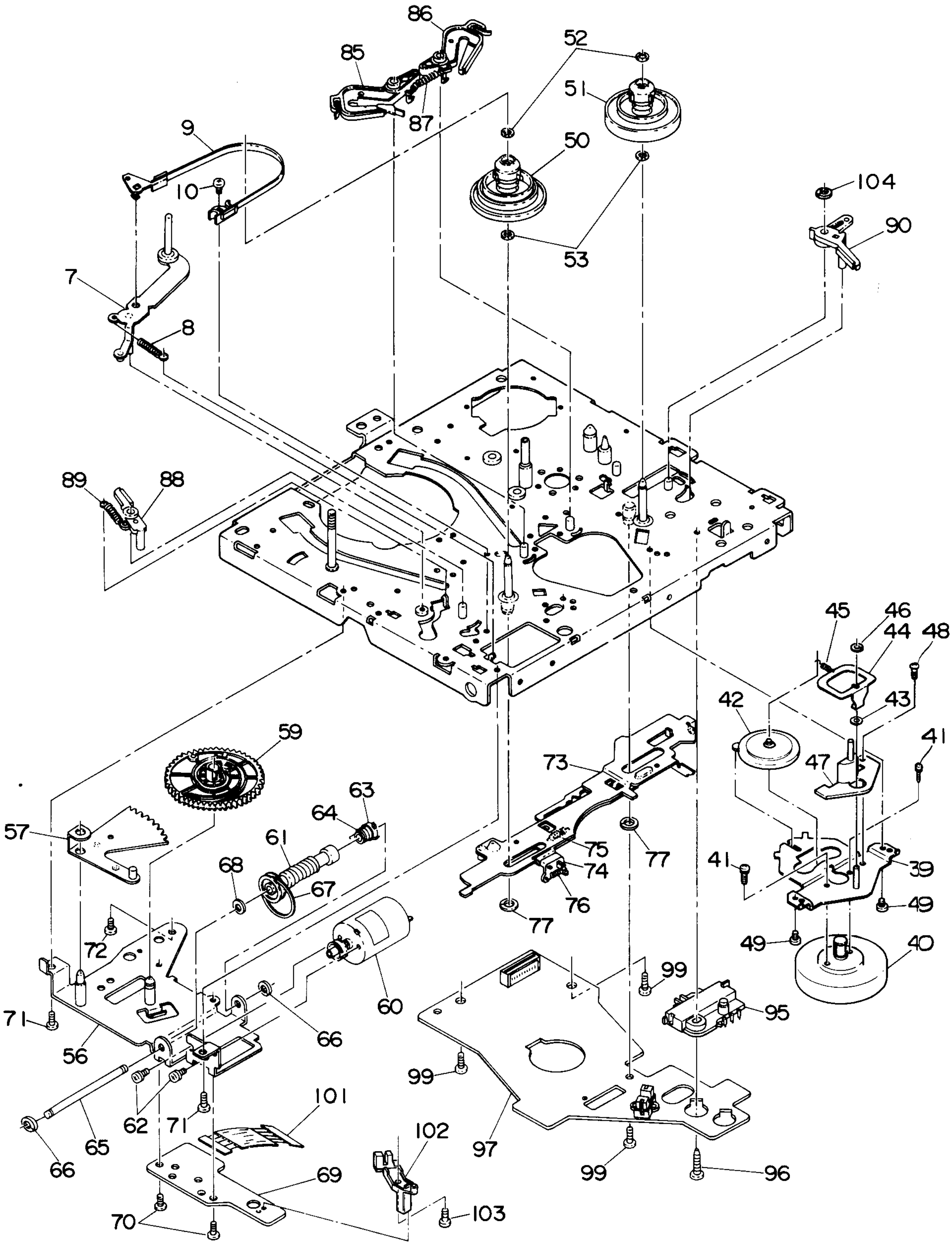
25
21
84
20
82
26
16
24
28
78
79
83
15
18
36
31
35
17
13
29
34
80
81
19
38
11
32
34
12
31
92
30
91
14
1
94
93
100
98
55
37
54

MECHANISM ASSEMBLY [M4]-2


86
52
85
51
87
50
9
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104
90
53
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89
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48
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71
60
95
56
66
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101
62
71
65
97
102
66
69
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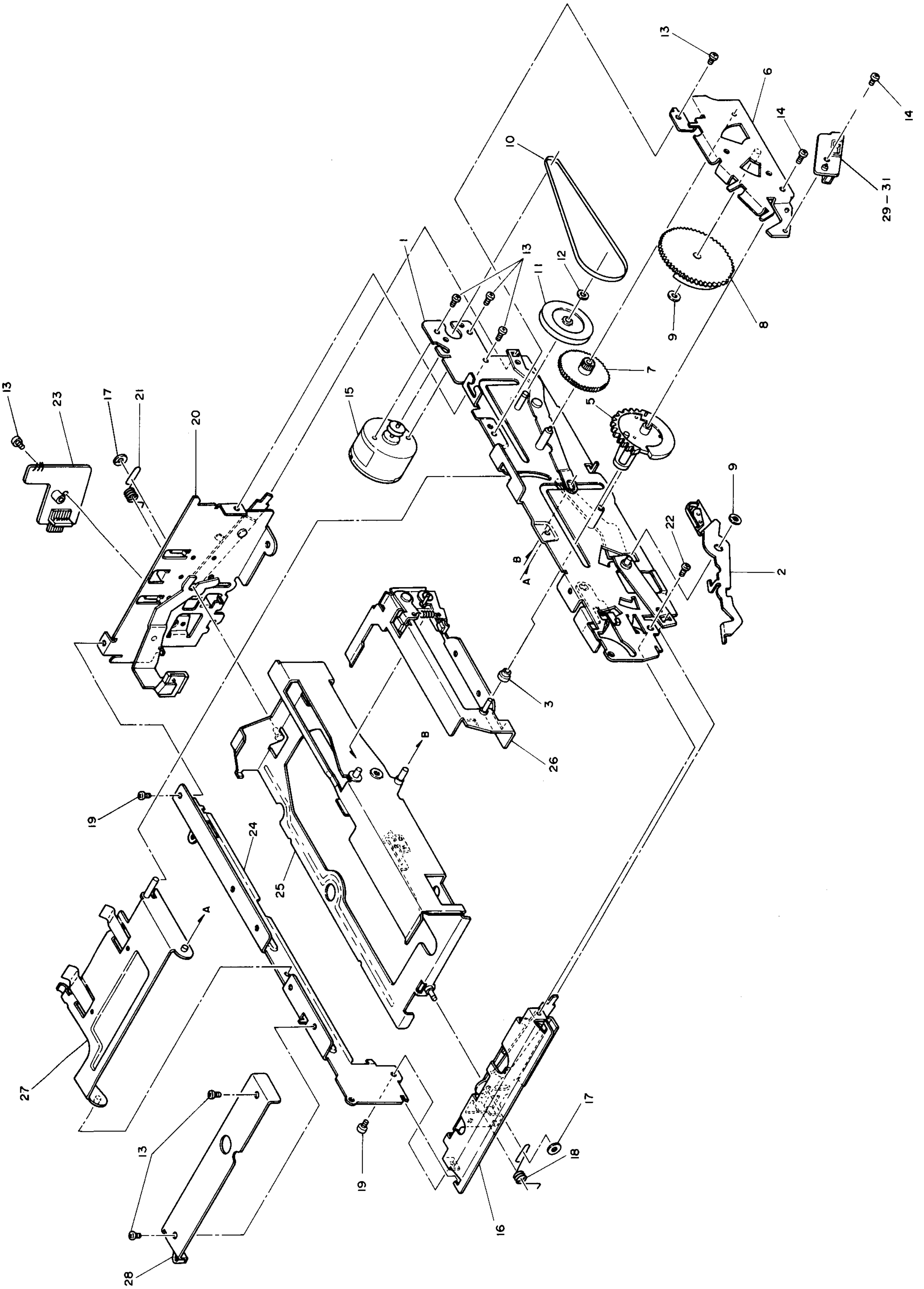
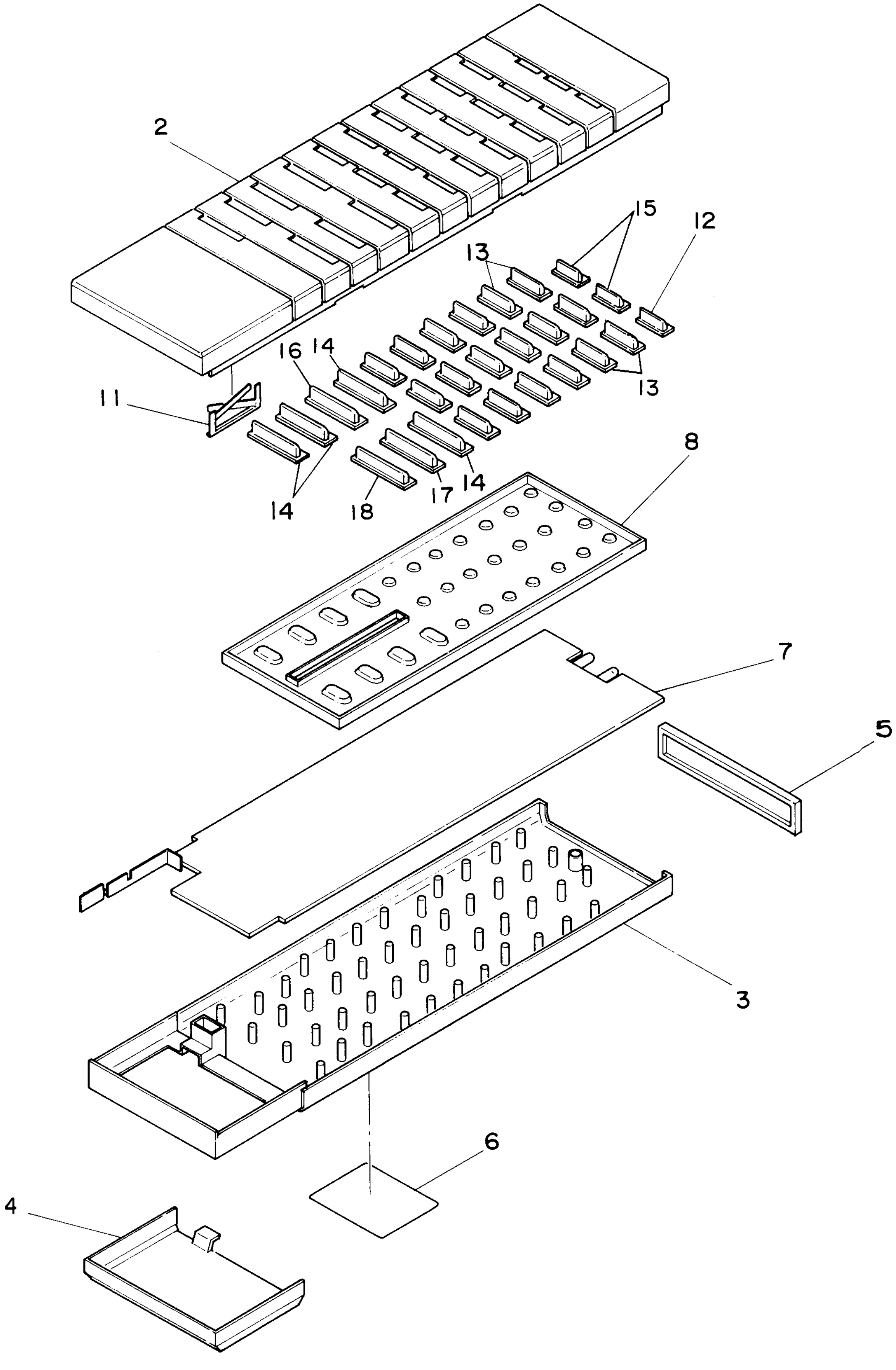
96
103
70

4.5 CASSETTE HOUSING ASSEMBLY [M5]


13
6
14
14
29 – 31
10
1
13
12
11
8
9
7
5
15
13
23
17
21
20
B
A
22
9
2
3
26
B
19
24
25
A
27
13
19
28
16
17
18

4.6 REMOTE CONTROL UNIT [M6]


2
15
12
13
16
14
11
13
8
14
18
17
14
7
5
3
6
4

SECTION 5
PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS– All resistance values are in ohms (Ω), unless otherwise indicated.

k : 1,000 (Kilo)
M : 1,000,000 (Mega)
Chip R : Chip Resistor
Chip VR : Chip Variable Resistor
Comp. R : Composition Resistor
CR : Carbon Film Resistor
FR : Fusible Resistor
MFR : Metal Film Resistor
MPR : Metal Plate Resistor
OMR : Oxide Metal Film Resistor
PMR : Precision Metal Film Resistor
UFR : Unflammable Resistor
VR : Variable Resistor (Potentiometer)
WR : Wire Wound Resistor

CAPACITORS–All capacitance values are in μF, unless otherwise indicated.

pF : μμF (Pico farad)
C Cap : Caramic Capacitor
Chip Cap : Chip Capacitor
Chip T Cap : Chip Tantalum Capacitor
E Cap : Electrolytic Capacitor
FM Cap : Film Mica Capacitor
LL Cap : Low Leak Current Electrolytic Capacitor
MM Cap : Metalized Mylar Capacitor
MP Cap : Metalized Paper Capacitor
MY Cap : Mylar Capacitor
NP Cap : Non-polar Capacitor
PC Cap : Polycarbonate Capacitor
PP Cap : Polypropylene Capacitor
PS Cap : Polystyrol Capacitor
T Cap : Tantalum Capacitor
TF Cap : Thin Film Capacitor
TR Cap : Trimmer Capacitor

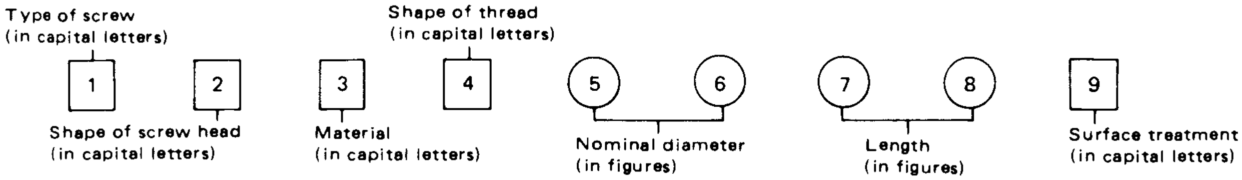
NOTES:

- [M] indicates mechanical symbol number.
- [2 digits] indicates circuit board symbol number.
- "X " indicates quantity per set.

5.1 STANDARD PART NUMBER CODING

5.1.1 Screw coding

Standard screw part numbers are as follows.


Type of screw
(in capital letters)
Shape of thread
(in capital letters)
1
2
3
4
5
6
7
8
9
Shape of screw head
(in capital letters)
Material
(in capital letters)
Nominal diameter
(in figures)
Length
(in figures)
Surface treatment
(in capital letters)

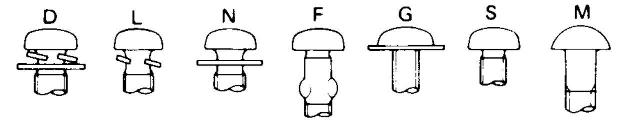
Type of screw (first digit)

S	Normal screws
D	Assembled machine screws (with plain and spring washers)
L	" (with spring washer)
N	" (with plain washer)
F	Feather screws
G	Washer head tapping screws
M	Wood screws

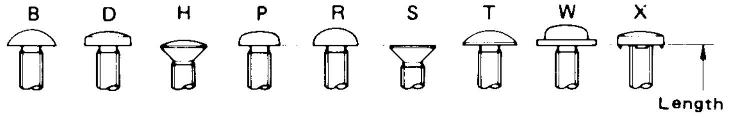
Shape of screw head (second digit)

B	Brazier head
D	Binding head
H	Oval countersunk head
P	Pan head
R	Round head
S	Flat head
T	Truss head
W	Washer head (machine screws)
X	Toothed head

–Type of screw (first digit) –



– Shape of screw head (second digit) –


B
D
H
P
R
S
T
W
X
Length

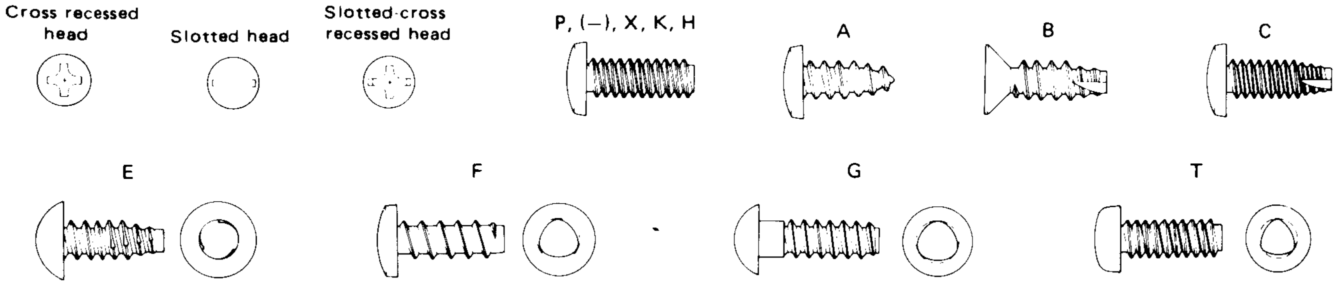
Material (third digit)

S	Steel	N	Nickel silver
E	Stainless steel	Y	Cast brass
C	Cast iron	A	Aluminum
U	Copper	Z	Zinc alloy
B	Brass	K	Polycarbonate
P	Phosphor bronze		

Shape of thread (fourth digit)

P	Cross recessed head screws
(–)	Slotted head machine screws
X	Slotted-cross recessed head machine screws
K	Cross recessed head machine screws for precision equipment (type 1)
H	" (type 3)
A	Cross recessed head tapping screws (type 1)
B	" (type 2)
C	" (type 3)
E	Cross recessed head special tapping screws (brand : evertight)
F	" (brand : P-tight)
T	" (brand : taptight)
G	"

– Shape of thread (fourth digit) –


Cross recessed head
Slotted head
Slotted-cross recessed head
P, (–), X, K, H
A
B
C
E
F
G
T

Nominal diameter (fifth and sixth digits)

The fifth and sixth digits indicate a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

Length (seventh and eighth digits)

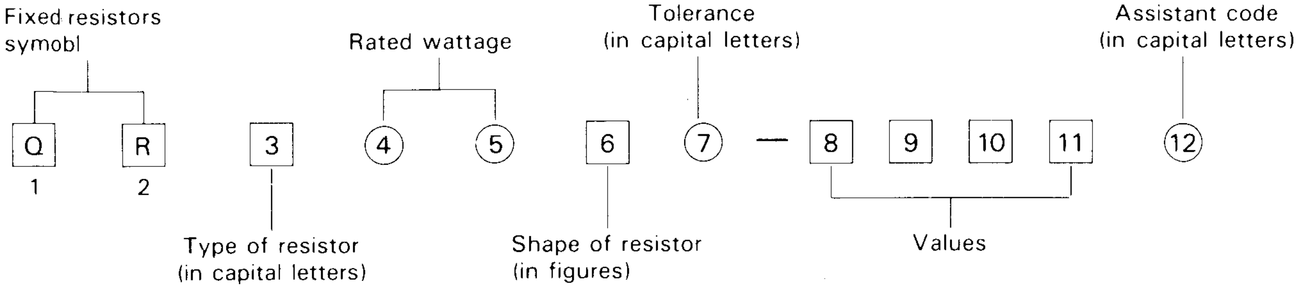
The seventh and eighth digits indicate length in millimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

Surface treatment (ninth digit)

Z	Dichromate treatment after galvanizing (MFZn II-C)
N	Nickel plating (MFNi II, MFNi I)
R	Chromium plating (MBCr II, MBCr I)
G	Silver plating (SP4)
B	Black coating after plating
F	Blackening of iron (FB)
M	Blackening after galvanizing
K	Pickling of brass (PF2)
P	Phosphate treatment
W	Uni-chrome plating
L	Coated with transparent paint
A	Colored red after galvanizing (MFZn II-C)
C	Colored blue after galvanizing (MFZn II-C)
T	Colored green after galvanizing (MFZn II-C)
V	Colored purple after galvanizing (MFZn II-C)

5.1.2 Fixed resistor coding

Fixed resistor part numbers are as follows.


Fixed resistors symobl
Rated wattage
Tolerance (in capital letters)
Assistant code (in capital letters)
Q
R
1
2
3
4
5
6
7
—
8
9
10
11
12
Type of resistor (in capital letters)
Shape of resistor (in figures)
Values

Type of resistor (third digit)

C	Composition resistors
D	Carbon film resistors
F	Unflammable resistors
G	Oxide metal film resistors
H	Fusible resistors
M	Metal plate resistors
S	Metal glazed resistors
V	Precision metal film resistors
W	Wire wound resistors
X	Metal film resistors
Z	Special resistors

Rated wattage (fourth and fifth digits)

A0	1/10 W
18	1/8 W
16	1/6 W
14	1/4 W
12	1/2 W
01	1 W
02	2 W
03	3 W
04	4 W
05	5 W
06	6 W
07	7 W
75	7.5 W
08	8 W
10	10 W
15	15 W
A6	16 W
20	20 W
30	30 W

Tolerance (seventh digit)

F	±1 %
G	±2 %
J	±5 %
K	±10 %
M	±20 %

Values (eighth — tenth or eleventh digits)

examples:

R47		0.47 Ω
4R7		4.7 Ω
470	47×10^{0}	47 Ω
471	47×10^{1}	470 Ω
472	47×10^{2}	4.7 kΩ
473	47×10^{3}	47 kΩ
474	47×10^{4}	470 kΩ
475	47×10^{5}	4.7 MΩ

QRV resistance shown by four digits:

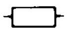
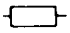
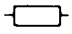
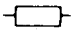
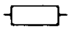
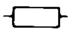
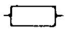
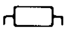
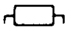
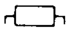
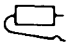
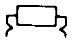
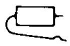
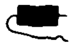
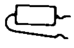
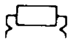
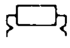
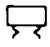
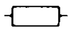
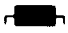
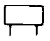
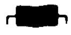
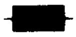
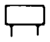
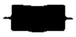
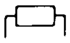
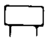
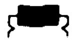
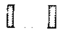
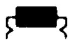
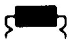
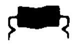
4640	464×10^{0}	464 Ω
4641	464×10^{1}	4.64 kΩ
4642	464×10^{2}	46.4 kΩ

Assistant code (twelfth digit)

A	Small type
B	Small type
S	Small type
Y	Lead taping
Z	Lead taping

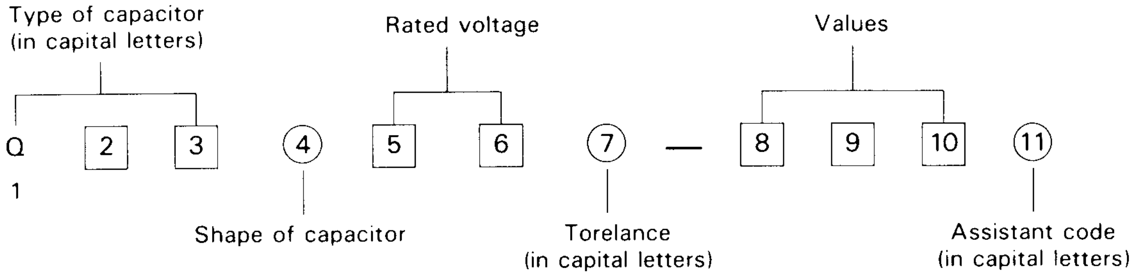
Shape of resistor (sixth digit)

Note: ■ indicates flame retardant resistor.

Type of resistor / Shape of resistor	C'	D	F	G	H	M	S	V	W	X
1										
2										
3										
4										
5									(L) type	
6										
7			Lug (B) type							
8			Lug (A) type				 Chip			
9			Lug (C) type							

5.1.3 Fixed capacitor coding

Fixed capacitor part numbers are as follows.


Type of capacitor (in capital letters)
Rated voltage
Values
Q
1
2
3
4
5
6
7
—
8
9
10
11
Shape of capacitor
Torelance (in capital letters)
Assistant code (in capital letters)

Ceramic capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Mono-direction	Kink lead	Axial lead	Axial forming lead	Chip
QCC	Ceramic	1		4	5	
QCD	High capacitance					A
QCF	High capacitance	1,4	3			8,A
QCS	Temperature compensation	1	3	4	5	8,A
QCT	Temperature compensation	Special coding				8,A
QCV	Ceramic			1	3	
QCX	Ceramic			1	3	
QCY	High capacitance	1,4	3	6	7	8,A
QCZ	Special type	Special coding				
QCB	**Ceramic**			B	C	

Electrolytic capacitors

Type of capacitor (first-third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Tubular	Mono-direction	Anti-stress	Forming	Snap-in
QEB	Low leakage		4	5	6	
QEC	Low leakage		4,8,A	9,B	6,C	
QEE	Tantalum (normal)		4	5	6	
	Tantalum (small)		8			
QEF	Chip tantalum	8 (chip type)				
QEG	Low impedance		4			
QEK	Miniature type		4	5	6	
QEL	Small type		4	5	6	7
QEM	Small type		4,A	5	6	
QEN	Non-polar	2	4	5	6	
QEP	Non-polar (small)		4,A	5,B	6,C	
QER	Miniature type		4	5	6	
QET	Small type	2	4,A	5,B	6,C	7
QEU	Small type		4	5	6	
QEV	Small type		4		6	7
QEW	Normal	2	4	5	6	7

Paper film capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
		Tubular	Normal		Flame retardant	
Symbol	Characteristics		Mono-direction	Kink lead	Mono-direction	Kink lead
QFA	Metalized polypropylene				7	
QFE	Metalized mylar				5	
QFF	Film mica		4			
QFG	Polypropylene film		4	8		
QFH	Metalized mylar	2	4	3	5,7	6
QFJ	Mylar (special)		4			
QFK	Metalized mylar (small)				5	
QFM	Mylar	2	4	3,7	5	6
QFN	Mylar (small)		4	3		
QFP	Polypropylene		4	3,8		
QFS	Polystyrole	2	4	3		
QFV	Thin film		4	8		
QFZ	Special type	Special coding				

Rated voltage (fifth and sixth digits)

Sixth digit / Fifth digit	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15	4.0		6.3				
1	10		16	20	25		40	50	63	80	35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

Tolerance (seventh digit)

A	$^{+100}_{-10}$ %	M	±20 %
F	±1 %	N	±30 %
G	±2 %	P	$^{+100}_{-0}$ %
H	$^{+50}_{-10}$ %	R	$^{+30}_{-10}$ %
J	±5 %	X	$^{+40}_{-20}$ %
K	±10 %	Z	$^{+80}_{-20}$ %

Values (eighth — tenth digits)

Example : Values are in picofarads

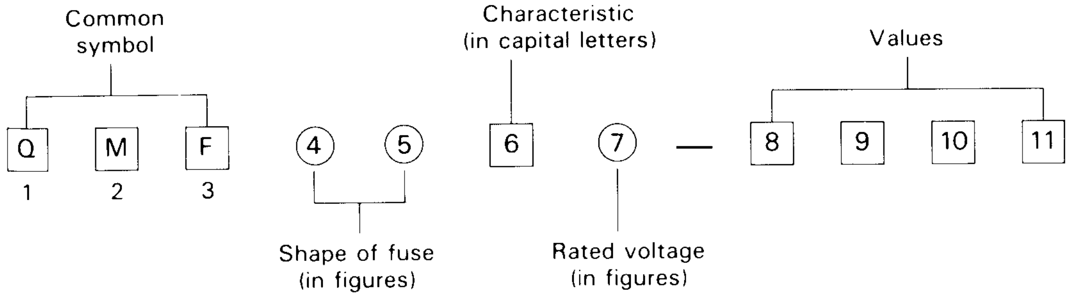
101 ....10×10^1 pF............. 100 pF
102 ....10×10^2 pF............. 1,000 pF (0.001 μF)
103 ....10×10^3 pF............. 10,000 pF (0.01 μF)
104 ....10×10^4 pF............. 100,000 pF (0.1 μF)
105 ....10×10^5 pF............. 1 μF
5R0 .... 5.0 pF

Assistant code (eleventh digit)

G	Small size
Z	Lead taping
Y	Lead taping

5.1.4 Fuse coding

Standard fuse part numbers are as follows.


Common symbol
Characteristic (in capital letters)
Values
Q
M
F
④
⑤
6
⑦
—
8
9
10
11
1
2
3
Shape of fuse (in figures)
Rated voltage (in figures)

Shape of fuse
(fourth and fifth digits)

51	φ5.2 × 20 mm
60	φ6.4 × 30 mm
61	φ6.35 × 31.8 mm
63	φ6.4 × 30 mm with lead wires
66	φ6.35 × 31.8 mm with lead wires
00	Special type

Rated voltage
(seventh digit)

1	AC125 V
2	AC250 V
3	0.1 – 1 A : AC250 V 1.25 – 6.3 A : AC125 V

Values
(eighth-tenth or eleventh digits)
example:

R63 .... 0.63 A
1R0 .... 1.0 A
2R5 .... 2.5 A
100 .... 10 A
R315 .... 0.315 A
1R25 .... 1.25 A

Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 – 2 sec.	
	400 %	0.01 – 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % – 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type (for UL)
	200 %	Within 2 min.	
	800 % – 2000 %	Within 0.01 sec.	

* * *

PACKING AND ACCESSORIES [M1]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	1	PQ31396-6-2	PACKING CASE, E
		PQ31396-5-2	PACKING CASE, EG
		PQ31396-4-3	PACKING CASE, EK
	2	PQ31397A-1	CUSHION ASS'Y
	3	PQ41026-11	PROTECT SHEET
	4	PQM30021-65	POLY BAG, E/EG, FOR SET
		PQM30045-28	POLY BAG, EK, FOR SET
	5	–	CABINET ASS'Y, REFER TO [M2]
	6	PUP40329	SERIAL NO. STICKER, X2
	7	–	–
	8	–	–
	9	–	–
	10	–	–
⚠	11	PU59167-3	CABLE ASS'Y
⚠	OR	PU59168-3	CABLE ASS'Y
	12	PU56142	PIN CORD ASS'Y
	13	QPGA020-02003	POLY BAG, E/EG
		PQM30023-8	POLY BAG, EK
⚠	14	PU30425-878	INSTRUCTION BOOK, E
⚠		PU30425-870	INSTRUCTION BOOK, EG
⚠		PU30425-863	INSTRUCTION BOOK, EK
	15	BT-20069A	WARRANTY CARD, EG
		BT-20060	GUARANTY CARD, EK
⚠	16	PU36158-1-1	DBP INF. SHEET, EG ONLY
	17	BT-20066	E. DISTRI. LIST, EK ONLY
	18	QPGA025-03505	POLY BAG, E/EG
		PQM30023-5	POLY BAG, EK
⚠	19	PQ10342Q-5	REMOTE CONTROL UNIT, E, REFER TO [M6], INCL. 20
⚠		PQ10342J-5	REMOTE CONTROL UNIT, EG, REFER TO [M6], INCL. 20
⚠		PQ10342P-5	REMOTE CONTROL UNIT, EK, REFER TO [M6], INCL. 20
	20	PQ10342-009	POLY BAG, REMOTE CONTROL UNIT
	21	–	CASSETTE TAPE, PTE-30-101
	22	UM-4NJ2P	BATTERY, 2 CELLS

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CABINET ASSEMBLY [M2]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
⚠	1	PQ10399C	FRONT PANEL ASS'Y, E, INCL. 31–40
⚠		PQ10399B-5	FRONT PANEL ASS'Y, EG, INCL. 31–40
⚠		PQ10399A	FRONT PANEL ASS'Y, EK, INCL. 31–40
⚠	2	PQ10365-4	TOP COVER
	3	–	–
	4	SDSF3010Z	TAP. SCREW, X3, BOTTOM PLATE
	5	PU57662-1-1	FOOT, X4
⚠	6	PQ10362-1-4	BOTTOM PLATE
	7	SDSA4014M	TAP. SCREW, X4, TOP COVER
	8	–	RATING LABEL
	9	PQ31189F	CASSETTE PLATE ASS'Y
	10	PQ42946	DOOR SPRING
	11	PQ42269-1-4	ROUND KNOB, LEVEL
	12	–	CHASSIS ASS'Y, REFER TO [M3]
	13	–	FRONT BOARD ASS'Y, REFER TO [21]
	14	–	HEADPHONE BOARD ASS'Y, REFER TO [25]
	15	SDSF2608Z	TAP. SCREW, X7, FRONT AND HEADPHONE BOARDS
	16	PQM30017-24	SLIT WASHER, FRONT BOARD
	17	PQ31497B	DOOR ASS'Y, E/EG
		PQ31497A	DOOR ASS'Y, EK
	18	PQ31546C	MEMBRANE ASS'Y, E
		PQ31546B-1	MEMBRANE ASS'Y, EG
		PQ31546A	MEMBRANE ASS'Y, EK
⚠	19	PQ31498-3	POWER PLATE, E
⚠		PQ31498-2	POWER PLATE, EG
⚠	20	PQ41700	LABEL, EK ONLY
⚠	21	PU58020-3	CAUTION LABEL, X2, EK ONLY
	22	PQ42517-2	VOLUME KNOB, X2, PICTURE, TRACKING
	23	–	–
	24	–	–
	25	–	–
	26	–	–
	27	–	–
	28	–	–
	29	–	–
	30	–	–
	31	PQ42658	POWER BUTTON, E/EK, OPERATE
		PQ42658-2	POWER BUTTON, EG, OPERATE
	32	PQ42659	TACT BUTTON, X2, COUNTER/REMAIN/DATE, RESET
	33	PQ31494	OPERATION KNOB (A), E/EK
		PQ31494-2-2	OPERATION KNOB (A), EG
	34	PQ31493	OPERATION KNOB (B), E/EK
		PQ31493-2	OPERATION KNOB (B), EG
	35	PQ42660	OTR BUTTON, INSTANT REC
	36	PQ31489	SLIDE KNOB (L)
	37	PQ31490	SLIDE KNOB (R)
	38	PQ31492	SLIDE GUIDE, X2
	39	PQ31491	SLIDE PLATE
	40	SDSF2608Z	TAP. SCREW, X2, SLIDE PLATE

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CHASSIS ASSEMBLY [M3]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	1	PUS28104A	CASSETTE HOUSING ASS'Y, REFER TO [M5]
	2	–	MECHANISM ASS'Y, REFER TO [M4]
	3	–	POWER TRANS. BOARD ASS'Y, REFER TO [01]
	4	–	V/M/S BOARD ASS'Y, REFER TO [03]
	5	–	TUNER/IF BOARD ASS'Y, REFER TO [07]
	6	–	REGULATOR BOARD ASS'Y, REFER TO [02]
	7	–	AUDIO BOARD ASS'Y, REFER TO [09]
	8	–	TERMINAL BOARD ASS'Y, REFER TO [06]
	9	–	RF CONV. & MIX BOOSTER, REFER TO [07]
	10	–	VPS BOARD ASS'Y, E/EG, REFER TO [18]
	11	–	DEMODULATOR BOARD ASS'Y, E/EG, REFER TO [14]
	12	–	POWER TRANSISTOR BOARD ASS'Y, REFER TO [19]
	13	–	JUNCTION BOARD ASS'Y, REFER TO [16]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	14	–	–
	15	–	–
	16	–	–
	17	–	–
	18	–	CHASSIS
	19	–	–
	20	–	–
	21	PDV2063A	DRUM ASS'Y, INCL. 22–28
	22	–	UPPER DRUM BOARD, REFER TO [41]
	23	PDM2007A	UPPER DRUM ASS'Y
	24	PDM4001A	DRUM SCREW ASS'Y, X2
	25	PDM2035F-2	LOWER DRUM MOTOR ASS'Y
	26	PDM4015A-4	BRUSH ASS'Y
	27	DPSP2606Z	ASS'Y SCREW
	28	PQ41596B	COMMUTATOR ASS'Y
	29	SDSP2608Z	SCREW, X3, DRUM ASS'Y
	30	–	–
	31	PQ41396	SPECIAL SCREW, MAIN DECK
	32	SDSA4014Z	TAP. SCREW, X2, MAIN DECK
	33	SDST2605Z	TAP. SCREW, X2, CASS. HOUSING
⚠	34	SDSA4012Z	TAP. SCREW, X3, POWER TRANS.
⚠	35	SDST3014C	TAP. SCREW, TRANS BRACKET
⚠	36	SDST3006Z	TAP. SCREW, X4
	37	SDSF3010Z	TAP. SCREW, X2, TUNER/IF BOARD
	38	PQ31665A	DRUM SHIELD ASS'Y
	39	SDST2605Z	TAP. SCREW, X2, DRUM SHIELD ASS'Y
	40	PQ40433-2	EARTH LUG
	41	SDST2606Z	TAP. SCREW, EARTH LUG
	42	DPSP2606Z	SCREW, X2, V/M/S BOARD
	43	SDSF3010Z	TAP. SCREW, X2, AUDIO BOARD
	44	SDSF3010Z	TAP. SCREW, JUNCTION BOARD
	45	SDSF3010Z	TAP. SCREW, E/EG, X2, DEMOD BOARD
	46	SDSF3010Z	TAP. SCREW, E/EG, X2, VPS BOARD
	47	PQ42271	EARTH SPRING, CASS. HOUSING
	48	PQ42600	EARTH PLATE, RF CONV. & MIX BOOSTER
	49	SDSF3010Z	TAP. SCREW, X3, RF CONV. & MIX BOOSTER
	50	–	FUSE, F1–4, E/EG, REFER TO [01]
		–	FUSE, F1–3, EK, REFER TO [01]
⚠	51	PU59459	POWER TRANSFORMER, E/EG
⚠		PU59458	POWER TRANSFORMER, EK
	52	PU58865-3	FLAT WIRE

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MECHANISM ASSEMBLY [M4]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	1	–	MAIN DECK ASS'Y
	2	–	–
	3	–	–
	4	–	–
	5	–	–
	6	–	–
	7	PQ41944A-7	TENSION ARM ASS'Y INCL. 8
	8	PQ41952-3	SPRING
	9	PQ41948A	TENSION BAND ASS'Y
	10	SDST2606N	TAP. SCREW, TENSION BAND ASS'Y
	11	PU57641-2	FULL ERASE HEAD
	12	PQ31036	FE HEAD BASE
	13	SPSG2606Z	TAP. SCREW, FE HEAD
	14	PQ41954-1-1	TORSION SPRING
	15	PQ41955	IMPEDANCE ROLLER
	16	PQ41956	COLLAR
	17	PQ41957	LOWER FLANGE
	OR	PQ42958	LOWER FLANGE
	18	PQM30018-39	SPACER
	OR	PQM30018-50	SPACER
	19	PQM30002-124	COMP. SPRING
	20	PQ40353	NYLON NUT
	21	PU59253	A/CTL HEAD
	22	PU55535	SHIELD CAP
	23	HPSP2015N	SCREW, SHIELD CAP
	24	PQ42208	HEAD BASE
	25	SPSP2608Z	SCREW, X 3, A/CTL HEAD
	26	PU30080-49	SPRING, X 3
	27	–	A/CTL HEAD BOARD, REFER TO [12]
	28	SDSP2606Z	SCREW, X2, HEAD BASE
	29	PQ41963A-1	P. BASE ASS'Y (T)
	30	PQ41969A	P. BASE ASS'Y (S)
	31	PQM30017-5	SLIT WASHER, X 2
	32	PU53629-2	TAPE GUIDE
	33	–	–
	34	PQ40268-2	GUIDE FLANGE, X 2
	35	PQ41346	GUIDE POLE CAP
	36	SDSP2006Z	SCREW, TAPE GUIDE
⚠	37	PU58635V	CAPSTAN MOTOR
	38	SPSP2605N	SCREW, X3, CAPSTAN MOTOR
	39	PQ41974A	R M BRACKET ASS'Y
⚠	40	PU58636W	REEL MOTOR
	41	LPSP2604Z	SCREW, X2, REEL MOTOR
	42	PU58645-1-1	IDLER ARM
	43	Q03093-834	WASHER
	44	PQ41976A-1	SPRING ARM ASS'Y, INCL. 45
	45	PQ42212-1-4	TENSION SPRING
	46	PQM30017-22	SLIT WASHER
	47	PQ41978	HOLDER
	48	SPST2606Z	TAP. SCREW
	49	SPST2606Z	TAP. SCREW, X 2
	50	PU59250-1-1	REEL DISK (S)
	51	PU58638-1-2	REEL DISK (T)
	52	PQM30017-5	SLIT WASHER, X 2
	53	Q03093-828	WASHER, X 2
	54	PQ41979A-4	L ARM ASS'Y (S)
	55	PQ41985A-2	L ARM ASS'Y (T)
	56	PQ41992A-1	CAM BRACKET ASS'Y
	57	PQ41994A-1	ARM GEAR ASS'Y
	58	–	–
	59	PQ20250-1-1	CONTROL CAM
⚠	60	PQ41996A	MODE MOTOR ASS'Y
	61	PQ41998A	WORM ASS'Y
	62	LPSP2604Z	SCREW, X2, MODE MOTOR
	63	PQ42001	WINDMILL
	64	PQ42002	CLUTCH SPRING
	65	PQ42003	WORM SHAFT
	66	PQM30017-5	SLIP WASHER, X 2
	67	PQM30003-17	BELT
	68	PQM30018-22	SPACER
	69	–	RELAY BOARD, REFER TO [52]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	70	SPST2606Z	TAP. SCREW, X 2, RELAY BOARD
	71	SPST2606Z	TAP. SCREW, X 2, CAM BRACKET ASS'Y
	72	SPSP2603Z	SCREW, CAM BRACKET ASS'Y
	73	PQ42038A-3	PLATE ASS'Y INCL. 74—76
	74	PQ31044-1-2	LOCK LEVER
	75	PQM30001-191	TENSION SPRING
	76	PQM30001-211	TENSION SPRING
	77	PQM30017-28	SLIT WASHER, X 2
	78	PQ42006B	P R ARM ASS'Y
	79	PQM30017-28	SLIT WASHER
	80	Q03093-833	WASHER
	81	PQM30001-193	TENSION SPRING
	82	PQ42013B-4	GUIDE ARM ASS'Y INCL. 83
	83	PQ42029	SPRING
	84	PQM30017-6	SLIT WASHER
	85	PQ42019A-3	M. BRAKE ASS'Y (S)
	86	PQ42020A-2	M. BRAKE ASS'Y (T)
	87	PQM30001-216	CLUTCH SPRING
	88	PQ42021A-1	SUB BRAKE ASS'Y (S) INCL. 89
	89	PQ42023-1-2	TENSION SPRING
	90	PQ42037A-2	SUB BRAKE ASS'Y (T)
	91	PU59452	LED HOLDER
	OR	PU58640	LED HOLDER
	92	SPST2606Z	TAP. SCREW, LED HOLDER
	93	—	END SENSOR BOARD ASS'Y, REFER TO [54]
	94	SPST2606Z	TAP. SCREW, END SENSOR BOARD
	95	PU58642	SLIDE ENCODER
	96	SDSP2610Z	SCREW, SLIDE ENCODER
	97	—	DECK TERMINAL BOARD ASS'Y, REFER TO [51]
	98	—	REC SAFETY BOARD ASS'Y, REFER TO [53]
	99	SDSP2606Z	SCREW, X 3, DECK TERMINAL BOARD
	100	SDST2606Z	TAP. SCREW, REC SAFETY BOARD
	101	PW30110-26DD885	PARALLEL WIRE
	102	PU59251	REEL SENSOR (S)
	103	SPSP2603Z	SCREW, REEL SENSOR (S)
	104	PQM30017-6	SLIT WASHER

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CASSETTE HOUSING ASSEMBLY [M5]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	1	PQ31008A	MAIN BRACKET ASS'Y
	2	PQ41921A-2	DOOR LEVER ASS'Y
	3	PQ42214-3	COLLAR
	4	—	—
	5	PQ31010	DRIVE GEAR
	6	PQ31012A	GEAR BKT ASS'Y
	7	PQ41906	SHIFT GEAR
	8	PQ31021	CAM GEAR
	9	PQM30017-24	SLIT WASHER, X 2
	10	PQM30003-16	BELT
	11	PQ42055	PULLEY GEAR
	12	PQM30017-23	SLIT WASHER
	13	SPSP2603Z	SCREW, X 7
	14	SPSP2605Z	SCREW, X 2
⚠	15	PQ41927A	MOTOR ASS'Y
	16	PQ31014A	FRONT BKT ASS'Y
	17	PQM30017-5	SLIT WASHER, X 2
	18	PQ31016-1-2	TOR. SPRING
	19	SPST2605Z	TH. TAP. SCREW, X 2
	20	PQ31017A	REAR BKT ASS'Y
	21	PQ31016-2-2	TOR. SPRING
	22	SPST2605Z	TH. TAP SCREW
	23	—	LED BOARD, REFER TO [56], INCL. 29
	24	PQ31237A	SIDE BRACKET
	25	PQ31022A	HOLDER ASS'Y
	26	PQ31024A	SLIDER ASS'Y
	27	PQ31026A-2	H. LEVER ASS'Y
	28	PQ41903	STAY
	29	—	CASSETTE SENSOR BOARD
	30	PN268R-NC	PHOTO TRANSISTOR
	31	PQ41926	PHOTO TRANSISTOR CAP

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REMOTE CONTROL UNIT [M6]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	1	—	REMOTE CONTROL UNIT, REFER TO [M1], INCL. 2—18
	2	PU36137-11	TOP CASE, E
		PU36137-7	TOP CASE, EG
		PU36137-12	TOP CASE, EK
	3	PQ31360	BOTTOM CASE
	4	PQ31361	BATTERY CAP
	5	PU36138-2	WINDOW
	6	PU36139-14-2	REMOCON LABEL, E
		PU36139-10-2	REMOCON LABEL, EG
		PU36139-15-2	REMOCON LABEL, EK
	7	—	REMOTE CONTROL BOARD ASS'Y, REFER TO [RM]
	8	PQ10342-002	RUBBER SHEET
	9	—	—
	10	—	—
	11	PQ10342-005	BATTERY TERMINAL
	12	PQ10342-015	BUTTON
	13	PQ10342-016	BUTTON, X 18
	14	PQ10342-017	BUTTON, X4
	15	PQ10342-018	BUTTON, X 2
	16	PQ10342-019	BUTTON
	17	PQ10342-020	BUTTON
	18	PQ10342-021	BUTTON

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22415B-04 (E/EG)	POWER SUPPLY BOARD ASS'Y [01],[02]
		PU22415A-04 (EK)	POWER SUPPLY BOARD ASS'Y [01],[02]
⚠		QMP3980-200	POWER CORD, E/EG
⚠		QMP5140-200	POWER CORD, EK
⚠		QHS3771-108	STRAIN RELIEF
		PU22414-2	TRANS. BRACKET, E/EG
		PU22414	TRANS. BRACKET, EK
⚠		QMC9021-001	AC OUTLET, E/EG
⚠		PQ31682	AC COVER
⚠	RY1	PU59457	RELAY, E/EG
	WR1	PW30101-50AA666	PARALLEL WIRE, X 2
⚠	SCR1	SDST3006Z	TAPPING SCREW, X 3

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22415B1-04(E/EG)	POWER TRANS. BOARD ASS'Y [01]
		PU22415A1-04 (EK)	POWER TRANS. BOARD ASS'Y [01]
	D1	10E2	DIODE
	D2	10E2	DIODE
	D3	10E2	DIODE
	D4	10E2	DIODE
	D5	10E2	DIODE
	D6	10E2	DIODE
	D7	S5688G-TPA3	DIODE
	OR	11E2	DIODE
	OR	ERA15-02	DIODE
	OR	1SR35-200AT-82	DIODE
	D8	S5688G-TPA3	DIODE
	OR	11E2	DIODE
	OR	ERA15-02	DIODE
	OR	ISR35-200AT-82	DIODE
	D16	S5688G	DIODE, E/EG
	OR	11E2	DIODE, E/EG
	OR	ERA15-02	DIODE, E/EG
	DS1	D5FB10-1	DIODE STACK
⚠	R1	QRZ0052-100	FR
	C1	QFK52AK-473	MY CAP
	C2	QETB1EM-228	E CAP
	C3	QET71EM-478	E CAP
	C4	QETB1CM-338	E CAP
⚠	C101	QCZ9016-472P	C CAP
⚠	LF1	PU59581	LINE FILTER, E/EG
⚠	LF2	PU59586	LINE FILTER, E/EG

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
⚠	HD	PU57505	FUSE CLIP, X8, F1–F4, E/EG
⚠		PU57505	FUSE CLIP, X6, F1–F3, EK
⚠	TAB	A74316	TAB, X 2

THE FOLLOWING FUSES ARE NOT INCLUDED IN CIRCUIT BOARD ASS'Y.

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
⚠	F1	QMF51E2-R50	FUSE
⚠	F2	QMF51E2-2R5	FUSE
⚠	F3	QMF51E2-1R0	FUSE
⚠	F4	QMF51E2-2R0	FUSE, E/EG

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22415B2-04(E/EG)	REGULATOR BOARD ASS'Y [02]
		PU22415A2-04 (EK)	REGULATOR BOARD ASS'Y [02]
	Q1	–	–
	Q2	–	–
	Q3	2SD637Q,R,S	TRANSISTOR
	Q4	–	–
	Q5	2SD637Q,R,S	TRANSISTOR
	Q6	2SB1185(DE)	TRANSISTOR
	OR	2SB1015O,Y	TRANSISTOR
	Q7	2SB851R,S	TRANSISTOR
	OR	2SB644R,S	TRANSISTOR
⚠	Q8	2SA1020O,Y	TRANSISTOR
	D9	S5688G	DIODE
	OR	11E2	DIODE
	OR	ERA15-02	DIODE
	OR	1SR35-200AT-82	DIODE
	D10	HZ6C2	ZENER DIODE
	D11	HZ4A2	ZENER DIODE
⚠	D12	HZ15-2	ZENER DIODE
⚠	D13	HZ15-2	ZENER DIODE
	D14	HZ12C1	ZENER DIODE
	D15	S5688G	DIODE, E/EG
	OR	11E2	DIODE, E/EG
	OR	ERA15-02	DIODE, E/EG
	R1	–	–
	R2	–	–
	R3	QRD181J-682	CR
	R4	QRD181J-122	CR
	R5	QRD181J-272	CR
	R6	QVZ3521-102	VR, UNSW 12 V DC
	R7	QRD181J-332	CR
	R8	QRD181J-103	CR
	R9	QRD181J-222	CR
	R10	QRD181J-822	CR
	R11	QRD181J-561	CR
	R12	QRD181J-331	CR
	R13	QRD181J-471	CR
	R14	QRD181J-271	CR
	R15	QVZ3521-331	VR, SWD 5.33 V DC
	R16	QRD181J-222	CR
	R17	–	–
	R18	QRD181J-222	CR
	R19	QRD181J-682	CR
	R20	QRD181J-272	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R21	QRD181J-331	CR
	R22	QRD181J-331	CR
	R23	QRD181J-331	CR
⚠	R24	PU52108-470	POSISTOR
	C1	–	–
	C2	–	–
	C3	–	–
	C4	–	–
	C5	QFN31HJ-103	MY CAP
	C6	QETC1HM-106	E CAP
	C7	QCS31HJ-470	C CAP
	C8	QFN31HJ-103	MY CAP
	C9	QETC1CM-107	E CAP
	C10	QETC1CM-336	E CAP
	C11	QETC1CM-107	E CAP
	C12	QETC1CM-336	E CAP
	C13	QCS31HJ-470	C CAP
	C14	QFN31HJ-103	MY CAP
	C15	QETC1AM-107	E CAP
	C16	QETC1JM-476	E CAP
	C17	QETC1JM-107	E CAP
	C18	QCS31HJ-470	C CAP
	C19	QETC1HM-226	E CAP
	C20	QETC1VM-226	E CAP
⚠	CP2	ICP-N15	CIRCUIT PROTECTOR
	CN1	PU58844-107	CAP. HOUSING
	CN2	PU58844-103	CAP. HOUSING
	CN3	PU58844-103R	CAP. HOUSING
	CN4	PU58844-104	CAP. HOUSING
	CN5	PU58844-109	CAP. HOUSING
	CN6	PU58844-9	CAP. HOUSING
	TAB	A74017	TAB, GND
	TP	PU55774	TEST PIN, TP1–4

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
* * *	* * *	* * * * * *	* * * * * * * * * * * *
		PU11469B-02(E/EG)	VIDEO/MECHACON/SERVO BOARD ASS'Y [03]
		PU11469A-02 (EK)	VIDEO/MECHACON/SERVO BOARD ASS'Y [03]
	– VIDEO SECTION –		
	IC401	HA11870NT	INTEGRATED CIRCUIT
	IC402	PU22282A	Y. MODULE, JA016
	IC403	7VT12	INTEGRATED CIRCUIT
	Q401	DTC144ES	D. TRANSISTOR
	Q402	DTC144ES	D. TRANSISTOR
	Q403	DTC144ES	D. TRANSISTOR
	Q404	DTC144ES	D. TRANSISTOR
	Q405	2SC1740S(QRS)	TRANSISTOR
	Q406	2SC1740S(QRS)	TRANSISTOR
	Q407	2SA1309R,S	TRANSISTOR
	Q408	2SC1740S(QRS)	TRANSISTOR
	Q409	DTC144WS	D. TRANSISTOR
⚠	Q410	2SA1309R,S	TRANSISTOR
	Q411	DTC144WS	D. TRANSISTOR
⚠	Q412	2SA1309R,S	TRANSISTOR
	Q413	2SA1309R,S	TRANSISTOR
	Q414	2SC1740S(QRS)	TRANSISTOR
	Q415	2SC1740S(QRS)	TRANSISTOR
	Q416	2SA1309R,S	TRANSISTOR
	Q417	2SA1309R,S	TRANSISTOR
	Q418	2SA1309R,S	TRANSISTOR
	Q419	DTA144ES	D. TRANSISTOR
	Q420	2SC1740S(QRS)	TRANSISTOR
	Q421	2SB810H,J	TRANSISTOR
	Q422	DTC144WS	D. TRANSISTOR
	Q423	2SC1740S(QRS)	TRANSISTOR
	D401	1SS133	DIODE
	D402	1SS133	DIODE
	D403	1SS133	DIODE
	D404	1SS133	DIODE
	D405	–	–
	D406	1SS133	DIODE
	D407	1SS133	DIODE
	D408	1SS133	DIODE
	D409	OA90	DIODE
	D410	OA90	DIODE
	D411	1SS133	DIODE
	D412	1SS133	DIODE
	D413	–	–
	D414	1SS133	DIODE
	D415	1SS133	DIODE
	D416	1SS133	DIODE
	D417	1SS133	DIODE
	D418	1SS133	DIODE
	D419	1SS133	DIODE
	D420	1SS133	DIODE

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	D421	1SS133	DIODE
	D422	1SS133	DIODE
	D423	1SS133	DIODE
	D424	1SS133	DIODE
	D425	1SS133	DIODE
	D426	1SS133	DIODE
	R401	QRD161J-103	CR
	R402	QRD161J-153	CR
	R403	QRD161J-474	CR
	R404	QRD161J-223	CR
	R405	QRD161J-223	CR
	R406	QRD161J-103	CR
	R407	QRD161J-151	CR
	R408	QRD161J-151	CR
	R409	QRD161J-332	CR
	R410	QRD162J-102	CR
	R411	QRD161J-332	CR
	R412	QRD161J-152	CR
	R413	QRD161J-222	CR
	R414	QRD161J-102	CR
	R415	QRD161J-101	CR
	R416	QVZ3518-222	VR, FREQ RESPONSE
	R417	QRD161J-391	CR
	R418	QRD161J-391	CR
	R419	QRD161J-561	CR
	R420	QRD161J-471	CR
	R421	QRD161J-393	CR
	R422	QRD161J-222	CR
	R423	QRD161J-103	CR
	R424	QRD161J-393	CR
	R425	QRD161J-222	CR
	R426	QRD161J-393	CR
	R427	QRD161J-222	CR
	R428	QRD161J-103	CR
	R429	–	–
	R430	QRD161J-225	CR
	R431	QRD161J-475	CR
	R432	QRD161J-562	CR
	R433	QRD161J-335	CR
	R434	QRD161J-562	CR
	R435	QRD161J-102	CR
	R436	QVZ3518-102	VR, SP REC FM LEVEL
	R437	QRD161J-821	CR
	R438	QRD161J-152	CR
	R439	QRD161J-272	CR
	R440	QRD161J-153	CR
	R441	QRD161J-153	CR
	R442	QRD161J-684	CR
	R443	QRD161J-824	CR
	R444	QRD161J-102	CR
	R445	QRD161J-222	CR
	R446	QRD161J-331	CR
	R447	QRD161J-151	CR
	R448	QRD161J-331	CR
	R449	–	–
	R450	QRD121J-391	CR
	R451	QRD161J-750	CR
	R452	QRD161J-102	CR
	R453	QRD161J-102	CR

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R454	QRD161J-222	CR
	R455	–	–
	R456	QRD161J-102	CR
	R457	QRD161J-223	CR
	R458	QRD161J182	CR
	R459	QRD161J-103	CR
	R460	QRD161J-103	CR
	R461	QRD161J-103	CR
	R462	QRD161J-473	CR
	R463	QRD161J-222	CR
	R464	QRD161J-122	CR
	R465	QRD161J-222	CR
	R466	QRD161J-102	CR
	R467	QRD161J-223	CR
	R468	QRD161J-223	CR
	R469	–	–
	R470	QRD161J-223	CR
	R471	QRD161J-223	CR
	R472	QRD161J-820	CR
	R473	QRD161J-152	CR
	R474	QRD161J-182	CR
	R475	QRD161J-182	CR
	R476	QRD161J-181	CR
	R477	QRD161J-124	CR
	C401	QCBB1HJ-471	C CAP
	C402	QCSB1HK-5R6	C CAP
	C403	QCVB1CN-103	C CAP
	C404	QET61HM-104	E CAP
	C405	QCF31HP-223	C CAP
	C406	QET60JM-476	E CAP
	C407	QCF31HP-223	C CAP
	C408	QET60JM-476	E CAP
	C409	QCVB1CN-103	C CAP
	C410	QFZ0096-224	MP CAP
	C411	–	–
	C412	QCSB1HJ-220	C CAP
	C413	QFZ0096-224	MP CAP
	C414	QCVB1CN-103	C CAP
	C415	QCBB1HJ-121	C CAP
	C416	QCVB1CN-103	C CAP
	C417	QCVB1CN-103	C CAP
	C418	QCBB1HJ-102	C CAP
	C419	QCSB1HK-5R6	C CAP
	C420	QCSB1HJ-101	C CAP
	C421	QCSB1HJ-180	C CAP
	C422	QCSB1HJ-470	C CAP
	C423	QCVB1CN-103	C CAP
	C424	QCSB1HJ-330	C CAP
	C425	–	–
	C426	QCF31HP-223	C CAP
	C427	QET60JM-476	E CAP
	C428	QCSB1HJ-330	C CAP
	C429	QCBB1HJ-151	C CAP
	C430	QET61HM-105	E CAP
	C431	QET61HM-105	E CAP
	C432	–	–
	C433	QCBB1HJ-181	C CAP
	C434	QEM51AK-107	E CAP
	C435	QCVB1CN-103	C CAP

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C436	QCBB1HJ-121	C CAP
	C437	QCBB1HJ-121	C CAP
	C438	QCSB1HJ-120	C CAP
	C439	QCBB1HK-102	C CAP
	C440	QET61HM-225	E CAP
	C441	QCBB1HJ-121	C CAP
	C442	QCSB1HJ-560	C CAP
	C443	QCSB1HJ-220	C CAP
	C444	QET60JM-107	E CAP
	C445	QET60JM-107	E CAP
	C446	QET61EM-335	E CAP
	C447	QET61HM-105	E CAP
	C448	QET61HM-225	E CAP
	C449	QET61HM-335	E CAP
	C450	QET61HM-225	E CAP
	C451	QET61CM-106	E CAP
	C452	QET61EM-335	E CAP
	C453	QCVB1CN-103	C CAP
	C454	QET61EM-475	E CAP
	C455	QETC0JM-477	E CAP
	C456	QET60JM-476	E CAP
	C457	QCF31HP-223	C CAP
	C458	QET61CM-476	E CAP
	C459	QET61AM-476	E CAP
	C460	QET61CM-476	E CAP
	C461	QET61CM-476	E CAP
	C462	QCVB1CN-103	C CAP
	C463	–	–
	C464	PU51163-151	C CAP
	C465	QCVB1CN-103	C CAP
	C466	QCVB1CN-103	C CAP
	C467	QFN41HJ-563	MY CAP
	C468	QCS11HJ-1R0	C CAP
	C469	QCSC1HJ-180	C CAP
	L401	PU48530-101K	PEAKING COIL
	L402	PU48530-101K	PEAKING COIL
	L403	PU59152-101J	PEAKING COIL
	L404	PU59152-390J	PEAKING COIL
	L405	PU59152-560J	PEAKING COIL
	L406	PU59152-180J	PEAKING COIL
	L407	PU59152-560J	PEAKING COIL
	L408	PU48530-101K	PEAKING COIL
	L409	PU59152-121J	PEAKING COIL
	L410	–	–
	L411	PU48530-151J	PEAKING COIL
	L412	PU59152-221J	PEAKING COIL
	L413	PU59152-470J	PEAKING COIL
	L414	PU59152-680J	PEAKING COIL
	L415	PU59152-560J	PEAKING COIL
	L416	PU59152-180J	PEAKING COIL
	L417	PU59152-180J	PEAKING COIL
	L418	PU48530-471J	PEAKING COIL
	L419	PU59152-121J	PEAKING COIL
	L420	PU48530-101K	PEAKING COIL
	L421	PU48530-101K	PEAKING COIL
	L422	PU48530-101K	PEAKING COIL
	L423	PU49993-6R8	COIL, E/EG
	L424	PU59152-470J	PEAKING COIL

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	LPF401	PU58021-2	LOW PASS FILTER
	DL401	PGZ00149	1H DELAY LINE
	EQ401	PU54838	EQUALIZER, E/EG
⚠	PTH401	PU52108-1R0	POSISTOR
	TH401	ERT-D2FGL101S	THERMISTOR
	SLD401	PU59536	PRE SHIELD (4)
	SLD402	PU59537	PRE SHIELD (2)
	SLD403	PU59538	PRE SHIELD (3)
	SPC401	PQ41028-7	SPACER
	H401	PU58018-1-2	BOARD HINGE, X3
	TAB	A74017	TAB, E/EG
	TP	PU57545	TEST PIN, TP402, 406, 410, GND 1, GND 2
	CN401	PU58844-6	CAP. HOUSING
	CN402	PU58844-3	CAP. HOUSING
	CN403	–	–
	CN404	PU58844-3	CAP. HOUSING
	CN405	PU58844-3	CAP. HOUSING
	CN406	PU58844-6	CAP. HOUSING, E/EG
		PU58844-4	CAP. HOUSING, EK
	CN407	PU58844-4	CAP. HOUSING
	CN408	–	–
	CN409	PU58844-2	CAP. HOUSING
	CN410	PU58844-2	CAP. HOUSING

	IC101	PU22046A	C. MODULE, JA005
	IC102	BA7007	INTEGRATED CIRCUIT, E/EG
	Q101	2SC1740S(QRS)	TRANSISTOR
	Q102	2SC1740S(QRS)	TRANSISTOR
	Q103	DTC144ES	D. TRANSISTOR
	Q104	DTC144ES	D. TRANSISTOR
	Q105	DTC144ES	D. TRANSISTOR
	Q106	DTC144ES	D. TRANSISTOR
	Q107	–	–
	Q108	DTC144ES	D. TRANSISTOR
	Q109	2SC1740S(QRS)	TRANSISTOR
	Q110	2SC1740S(QRS)	TRANSISTOR
	Q111	2SC1740S(QRS)	TRANSISTOR, E/EG
	Q112	2SC1740S(QRS)	TRANSISTOR, E/EG

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	D101	1SS133	DIODE
	D102	1SS133	DIODE
	D103	1SS133	DIODE
	D104	1SS133	DIODE
	D105	1SS133	DIODE
	D106	1SS133	DIODE, E/EG
	D107	1SS133	DIODE, E/EG
	D108	1SS133	DIODE, E/EG
	D109	1SS133	DIODE, E/EG
	D110	1SS133	DIODE
	D111	1SS133	DIODE
	R101	QRD161J-102	CR
	R102	QRD161J-102	CR
	R103	QRD161J-681	CR
	R104	QRD161J-272	CR
	R105	QRD161J-102	CR
	R106	QRD161J-102	CR
	R107	QRD161J-473	CR
	R108	QRD161J-102	CR
	R109	QRD161J-681	CR
	R110	QVZ3518-331	VR, REC COLOUR LEVEL
	R111	QRD161J-222	CR
	R112	QRD161J-122	CR
	R113	QRD161J-223	CR
	R114	QRD161J-223	CR
	R115	QRD161J-472	CR
	R116	QRD161J-274	CR
	R117	QVZ3518-223	VR, VXO, 4.43MHz
	R118	QRD161J-223	CR
	R119	QRD161J-333	CR
	R120	QRD161J-103	CR
	R121	QRD161J-103	CR
	R122	QRD161J-393	CR
	R123	QRD161J-122	CR
	R124	QRD161J-391	CR
	R125	–	–
	R126	–	–
	R127	QRD161J-221	CR
	R128	–	–
	R129	QRD161J-332	CR
	R130	QRD161J-561	CR
	R131	QRD161J-561	CR
	R132	QRD161J-102	CR
	R133	QRD161J-122	CR
	R134	QRD161J-471	CR
	R135	QRD161J-152	CR
	R136	QRD161J-223	CR
	R137	QRD161J-682	CR
	R138	QRD161J-102	CR
	R139	QRD161J-181	CR
	R140	QRD161J-391	CR
	R141	QRD161J-331	CR
	R142	QRD161J-822	CR, E/EG
	R143	QRD161J-393	CR, E/EG
	R144	QRD161J-332	CR, E/EG
	R145	QRD161J-154	CR, E/EG
	R146	QRD161J-563	CR, E/EG

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R147	QRD161J-182	CR, E/EG
	R148	QVZ3518-472	VR, E/EG, SECAM DETECTOR
	R149	QRD161J-103	CR, E/EG
	R150	QRD161J-562	CR, E/EG
	R151	QRD161J-333	CR, E/EG
	R152	QRD161J-393	CR, E/EG
	R153	QRD161J-102	CR, E/EG
	R154	–	–
	R155	QRD161J-392	CR, E/EG
	C101	QCVB1CN-103	C CAP
	C102	QCBB1HJ-271	C CAP
	C103	QCBB1HJ-101	C CAP
	C104	QCVB1CN-103	C CAP
	C105	QCC11CJ-473	C CAP
	C106	QCSB1HJ-470	C CAP
	C107	QET61CM-106	E CAP
	C108	QCVB1CN-103	C CAP
	C109	QCT25CH-220	C CAP
	C110	QCC11CJ-223	C CAP
	C111	QEK61HM-105	E CAP
	C112	QEK61EM-475	E CAP
	C113	QEK61EM-475	E CAP
	C114	QCSB1HJ-470	C CAP
	C115	QET61HM-105	E CAP
	C116	QET60JM-476	E CAP
	C117	QET61EM-475	E CAP
	C118	QCVB1CN-103	C CAP
	C119	QET61EM-335	E CAP
	C120	QCC11CJ-473	C CAP
	C121	QCC11CJ-563	C CAP
	C122	QET61CM-106	E CAP
	C123	QCC11BK-224	C CAP
	C124	QEK61HM-225	E CAP
	C125	QEK61CM-106	E CAP
	C126	QCVB1CN-103	C CAP
	C127	QCBB1HJ-102	C CAP
	C128	QCBB1HJ-102	C CAP
	C129	QCSB1HJ-100	C CAP
	C130	QCVB1CN-103	C CAP
	C131	QEK60JM-476	E CAP
	C132	QCF31HP-223	C CAP, E/EG
	C133	QEK61CM-476	E CAP, E/EG
	C134	QET61AM-336	E CAP, E/EG
	C135	QCC11CJ-182	C CAP, E/EG
	C136	QCXB1CN-272	C CAP, E/EG
	C137	QCC11CJ-223	C CAP, E/EG
	C138	QET61CM-106	E CAP, E/EG
	C139	QCVB1CN-103	C CAP, E/EG
	L101	–	–
	L102	PU48530-222J	PEAKING COIL
	L103	PU48530-271J	PEAKING COIL
	L104	PU48530-101K	PEAKING COIL
⚠	L105	PU48530-101K	PEAKING COIL
	L106	PU47051-822	COIL
	L107	PU59152-150J	PEAKING COIL

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	L108	PU59152-560J	PEAKING COIL
	L109	PU48530-101K	PEAKING COIL
	L110	PU47051-562	COIL, E/EG
	L111	PU49057	LC BLOCK, E/EG, Fh/2
	L112	PU48530-101K	PEAKING COIL, E/EG
	LCF101	PU59533	LC FILTER
	LPF101	PU58022	LOW PASS FILTER
	BPF101	PU59534	BAND PASS FILTER
⚠	XB101	PU58023	CRYSTAL BLOCK
⚠	X101	PU31449-4K	CRYSTAL
	CF101	PU56983	CERAMIC FILTER, E/EG
	DL101	PU59582	COMB FILTER
	TP	PU57545	TEST PIN, TP104, 106
	TP	PU57545	TEST PIN, TP110, E/EG

– MECHACON SECTION –

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	IC201	M50965-614SP	INTEGRATED CIRCUIT
	IC202	M54644AL	INTEGRATED CIRCUIT
	OR	M54644BL	INTEGRATED CIRCUIT
	IC203	TA8400P	INTEGRATED CIRCUIT
	IC204	M54644BL	INTEGRATED CIRCUIT
	Q201	2SA933S(RS)	TRANSISTOR
	Q202	2SD1292T103Q,R	TRANSISTOR
	OR	2SC2655O,Y	TRANSISTOR
	Q203	2SC2655O,Y	TRANSISTOR
	OR	2SD1292T103Q,R	TRANSISTOR
	Q204	2SA933S(RS)	TRANSISTOR
	Q205	2SC1741S(R)	TRANSISTOR
	Q206	DTC124ES	D. TRANSISTOR
	Q207	2SK656	D. MOS FET
	Q208	DTA124ES	D. TRANSISTOR, EK ONLY
	Q209	DTA124ES	D. TRANSISTOR

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	D201	10E2	DIODE
	OR	11E2	DIODE
	D202	MTZ6.8B	ZENER DIODE
	OR	RD6.8ES-T1B2	ZENER DIODE
	D203	MTZ6.8B	ZENER DIODE
	OR	RD6.8ES-T1B2	ZENER DIODE
	D204	1SS133	DIODE
	D205	1SS133	DIODE
	D206	MTZ7.5B	ZENER DIODE
	OR	RD7.5ES-T1B2	ZENER DIODE
	D207	HZS4.3EB2	ZENER DIODE
	D208	MA27TA	DIODE
	D209	1SS133	DIODE
	D210	DAN209S	DIODE ARRAY
	D211	1SS133	DIODE
	D212	–	–
	D213	–	–
	D214	RD5.6ES-T1B1	ZENER DIODE
	OR	MTZ5.6A	ZENER DIODE
	D215	MTZ10A	ZENER DIODE
	OR	RD10ES-T1B1	ZENER DIODE
	D216	1SS133	DIODE
	R201	QRD161J-223	CR
	R202	QRD161J-332	CR
	R203	QRD161J-332	CR
	R204	QRD161J-223	CR
	R205	QRX019J-4R7S	MFR
	R206	QRD161J-682	CR
	R207	QRD161J-103	CR
	R208	QRD161J-153	CR
	R209	QRD161J-103	CR
	R210	QRD161J-103	CR
	R211	QRD161J-103	CR
	R212	QRD161J-103	CR
	R213	QRD161J-103	CR
	R214	QRD161J-104	CR
	R215	QRD161J-332	CR
	R216	QRD161J-332	CR
	R217	QRD161J-472	CR
	R218	QRD161J-152	CR
	R219	QRD161J-472	CR
	R220	QRD161J-103	CR
	R221	–	–
	R222	QRD161J-562	CR
	R223	QRD161J-103	CR
	R224	QRD161J-103	CR
	R225	QRD161J-103	CR
	R226	QRD161J-103	CR
	R227	QRD161J-103	CR
	R228	QRD161J-103	CR
	R229	QRD161J-105	CR
	R230	QRD161J-472	CR
	R231	QRD161J-124	CR
	R232	QRD161J-124	CR
	R233	QRD161J-333	CR
	R234	QRD161J-333	CR
	R235	QRD161J-333	CR
	R236	QRD161J-1R0	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R237	QRD161J-103	CR
	R238	QRD161J-103	CR
	R252	QRD161J-472	CR
	R253	QRD161J-333	CR
	R254	QRD161J-333	CR
	R255	QRD161J-103	CR
	C201	QET61EM-107	E CAP
	C202	QFN31HJ-104	MY CAP
	C203	QFN31HJ-104	MY CAP
	C204	QCF31HP-223	C CAP
	C205	QET61EM-335	E CAP
	C206	QCF31HP-223	C CAP
	C207	QEN61EM-475	NP CAP
	C208	QET61EM-475	E CAP
	C209	QEE41CM-226	T CAP
	C210	QFN31HJ-473	MY CAP
	C211	QEN61EM-475	NP CAP
	C212	QCF31HP-102	C CAP
	C213	QET61HM-105	E CAP
	C214	QCF31HP-102	C CAP
	C215	QCSB1HJ-330	C CAP
	C216	QCSB1HJ-330	C CAP
	C217	QCC11CJ-473	C CAP
	L201	PU59425	COIL
⚠	CF201	PU55812	CERAMIC FILTER
	RA201	EXB-P83103M	RESISTOR ARRAY
	RA202	EXB-P86333M	RESISTOR ARRAY
⚠	CP1	ICP-N10	CIRCUIT PRTECTOR
	CN201	PU58844-8	CAP. HOUSING
	CN202	PU58844-7R	CAP. HOUSING
	CN203	PU58844-12	CAP. HOUSING
	CN204	PU58844-7	CAP. HOUSING
	CN205	PU58844-5	CAP. HOUSING
	CN206	PU58844-6	CAP. HOUSING
	CN207	PU58798-17	CAP. HOUSING
	CN208	–	–
	CN209	PU58844-2R	CAP. HOUSING
	CN210	PU58844-2	CAP. HOUSING, E/EG

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	– SERVO SECTION –		
	IC1	VC2023B	INTEGRATED CIRCUIT
	IC2	BA6405	INTEGRATED CIRCUIT
	IC3	M5224P	INTEGRATED CIRCUIT
	OR	IR3702	OM AMP
	Q1	2SA933S(RS)	TRANSISTOR
	Q2	2SC1740S(RS)	TRANSISTOR
	Q3	2SA933S(RS)	TRANSISTOR
	Q4	2SC1740S(RS)	TRANSISTOR
	Q5	DTC144ES	D. TRANSISTOR
	Q6	DTC144ES	D. TRANSISTOR
	Q7	2SD1292T103P,Q,R	TRANSISTOR
	OR	2SC2655O,Y	TRANSISTOR
	D1	1SS133	DIODE
	OR	MA165	DIODE
	D2	1SS133	DIODE
	OR	MA165	DIODE
	D3	1SS133	DIODE
	D4	–	–
	D5	1SS133	DIODE
	OR	MA165	DIODE
	D6	1SS133	DIODE
	OR	MA165	DIODE
	D7	1SS133	DIODE
	OR	MA165	DIODE
	D8	MTZ12B	ZENER DIODE
	D9	1SS133	DIODE
	OR	MA165	DIODE
	D10	MTZ5.1C	ZENER DIODE
	R1	QRD161J-103	CR
	R2	QRD161J-103	CR
	R3	QRD161J-105	CR
	R4	QRD161J-105	CR
	R5	QRD161J-105	CR
	R6	QRD161J-103	CR
	R7	QRD161J-103	CR
	R8	QRD161J-101	CR
	R9	QRD161J-473	CR
	R10	QRD161J-473	CR
	R11	QRD161J-473	CR
	R12	QRD161J-473	CR
	R13	QRD161J-473	CR
	R14	QRD161J-473	CR
	R15	QRD161J-105	CR
	R16	QRD161J-473	CR
	R17	QRD161J-473	CR
	R18	QRD161J-564	CR
	R19	QRD161J-683	CR
	R20	QRD161J-103	CR
	R21	QRD161J-822	CR
	R22	QRD161J-273	CR
	R23	QRD161J-103	CR
	R24	QRD161J-103	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R25	QRD161J-102	CR
	R26	QRD161J-333	CR
	R27	QVZ3518-474	VR, PB SWITCHING POINT
	R28	QRD161J-103	CR
	R29	QVZ3521-474	VR, V LOCK
	R30	QRD161J-102	CR
	R31	QRD161J-472	CR
	R32	QRD161J-223	CR
	R33	QRD161J-681	CR
	R34	QRD161J-564	CR
	R35	QRD161J-103	CR
	R36	QRD161J-103	CR
	R37	QRD161J-105	CR
	R38	QRD161J-681	CR
	R39	QRD161J-102	CR
	R40	QRD161J-331	CR
	R41	QRD161J-684	CR
	R42	QRD161J-102	CR
	R43	QRD161J-103	CR
	R44	QRD161J-223	CR
	R45	QRD161J-105	CR
	R46	QRD161J-104	CR
	R47	QRD161J-332	CR
	R48	QRD161J-102	CR
	R49	QRD161J-105	CR
	R50	QRD161J-333	CR
	R51	QRD161J-101	CR
	R52	QRD161J-153	CR
	R53	QRD161J-104	CR
	R54	QRD161J-104	CR
	R55	QRD161J-103	CR
	R56	QRD161J-472	CR
	R57	QRD161J-472	CR
	R58	QRD161J-185	CR
	C1	QFN31HK-272	MY CAP
	C2	–	–
	C3	QFN31HJ-473	MY CAP
	C4	QFN31HK-223	MY CAP
	C5	QCXB1CN-472	C CAP
	C6	QCXB1CN-472	C CAP
	C7	QFN31HK-473	MY CAP
	C8	QFN31HK-473	MY CAP
	C9	QCVB1CN-103	C CAP
	C10	QFN31HK-473	MY CAP
	C11	QFN31HK-473	MY CAP
	C12	QCXB1CN-472	C CAP
	C13	QCXB1CN-472	C CAP
	C14	QETC1EM-475	E CAP
	C15	QETC1EM-475	E CAP
	C16	QETC1EM-475	E CAP
	C17	QETC1EM-475	E CAP
	C18	QCBB1HJ-101	C CAP
	C19	QFN31HJ-682	MY CAP
	C20	QFN31HK-102	MY CAP
	C21	QFN31HJ-154	MY CAP
	C22	QFN31HK-104	MY CAP
	C23	QETC1CM-106	E CAP

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C24	QCBB1HJ-102	C CAP
	C25	QCBB1HJ-102	C CAP
	C26	QETC1HM-225	E CAP
	C27	QCBB1HJ-102	C CAP
	C28	QETC1CM-106	E CAP
	C29	QETC1AM-476	E CAP
	C30	QETC1CM-106	E CAP
	C31	QETC1CM-106	E CAP
	C32	QCBB1HJ-102	C CAP
	C33	QETC1AM-476	E CAP
	C34	QETC1EM-475	E CAP
	C35	QFN31HK-104	MY CAP
	C36	QCBB1HJ-101	C CAP
	C37	QEN61HM-105	NP CAP
	C38	QETC1HM-225	E CAP
	C39	QCBB1HJ-102	C CAP
	C40	QEN61HM-105	NP CAP
	C41	QCVB1CN-103	C CAP
	C42	QCVB1CN-103	C CAP
	C43	QCVB1CN-103	C CAP
	C50	QETA1CM-477	E CAP
	TP	PU57545	TEST PIN, TP1, 11, 12, GND
	CN1	PU58844-2	CAP. HOUSING
	CN2	PU58844-5	CAP. HOUSING
	CN3	PU58844-2	CAP. HOUSING

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		PU36202B-01(E)	TERMINAL BOARD ASS'Y [06]
		PU36202A-01(EG)	TERMINAL BOARD ASS'Y [06]
		PU36201A-01(EK)	TERMINAL BOARD ASS'Y [06]
	Q1	2SA1309R,S	TRANSISTOR, E/EG
	D1	1SS133	DIODE
	D2	1SS133	DIODE, EK ONLY
	D3	1SS133	DIODE, EK ONLY
	D4	1SS133	DIODE, EK ONLY
	D5	–	–
	D6	1SS133	DIODE, E/EG
	D7	1SS133	DIODE, E/EG
	R1	QRD161J-750	CR
	R2	QRD161J-331	CR
	R3	QRD161J-331	CR
	R4	QRD161J-102	CR
	R5	QRD161J-102	CR
	R6	QRD161J-102	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R7	QRD161J-102	CR
	R8	QRD161J-563	CR, E/EG
	R9	QRD161J-563	CR, E/EG
	R10	QRD161J-152	CR, E/EG
	R11	QRD161J-393	CR, E/EG
	R12	QRD161J-273	CR, E/EG
	R13	QRD161J-273	CR, E/EG
	LC1	PU59885-102L	EMI. FILTER, E/EG
	LC2	PU59885-102L	EMI. FILTER, E/EG
	RY1	PU55260	RELAY, E/EG
	TML	PU59503-3	TERMINAL BOARD, E
		PU59503-2	TERMINAL BOARD, EG
		PU59503	TERMINAL BOARD, EK
	CL1	PU56729	WIRE CLAMP

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# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22510A(E/EG)	TUNER/IF BOARD ASS'Y [07]
		PU22432A-02(EK)	TUNER/IF BOARD ASS'Y [07]
⚠	IC1	M51365SP	INTEGRATED CIRCUIT
⚠	IC2	M50440-394SP	INTEGRATED CIRCUIT
	IC3	M58655P	INTEGRATED CIRCUIT
	IC4	H8D7013	INTEGRATED CIRCUIT
	Q1	2SC3354S,T	TRANSISTOR
	Q2	2SD1468S(RS)	TRANSISTOR, EK ONLY
	OR	2SD1450S,T	TRANSISTOR, EK ONLY
	Q3	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	Q4	2SC1740S(RS)	TRANSISTOR, E/EG
	OR	2SC3311AR,S	TRANSISTOR, E/EG
	Q5	2SA933S(RS)	TRANSISTOR
	OR	2SA1309R,S	TRANSISTOR
	Q6	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	Q7	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	Q8	–	–
	Q9	2SB810H,J	TRANSISTOR, E/EG
	Q10	2SB810H,J	TRANSISTOR, E/EG
	Q11	2SB810H,J	TRANSISTOR, E/EG
	Q12	2SB810H,J	TRANSISTOR, E/EG
	Q13	2SK381	FET
	Q14	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	Q15	2SD1292T103Q,R	TRANSISTOR
	OR	2SC2655O,YTPE6	TRANSISTOR
	Q16	2SD1292T103Q,R	TRANSISTOR
	OR	2SC2655O,YTPE6	TRANSISTOR
	Q17	2SB810H,J	TRANSISTOR
	Q18	DTA124ES	D. TRANSISTOR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	Q19	–	–
	Q20	–	–
	Q21	–	–
	Q22	–	–
	Q23	–	–
	Q24	2SC3354S,T	TRANSISTOR, E/EG
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	1SS133	DIODE
	D5	1SS133	DIODE
	D6	HZ30-2	ZENER DIODE
	OR	RD33EB1	ZENER DIODE
	D7	MTZ10B	ZENER DIODE
	OR	RD10ES-T1B2	ZENER DIODE
	D8	–	–
	D9	–	–
	D10	E-452-2	C.R. DIODE
	D11	RD6.2ES-T1B1	ZENER DIODE
	D12	1SS133	DIODE, E/EG
	R1	QRD161J-151	CR, E/EG
		QRD161J-750	CR,EK
	R2	QRD161J-103	CR, E/EG
		QRD161J-472	CR, EK
	R3	QRD161J-152	CR
	R4	QRD161J-470	CR
	R5	QRD161J-331	CR
	R6	QRD161J-681	CR
	R7	QRD161J-101	CR
	R8	QRD161J-100	CR, E/EG
		QRD161J-470	CR, EK
	R9	QRD161J-332	CR, EK ONLY
	R10	QRD161J-824	CR
	R11	QVZ3518-472	VR, RF AGC
	R12	QRD161J-222	CR
	R13	QRD161J-562	CR
	R14	QRD161J-332	CR
	R15	QRD161J-152	CR, E/EG
	R16	QVZ3518-103	VR, E/EG, Y LEVEL
		QRD161J-222	CR, EK
	R17	QRD161J-331	CR, E/EG
		QRD161J-271	CR, EK
	R18	QRD161J-561	CR
	R19	QRD161J-470	CR
	R20	QRD161J-561	CR
	R21	–	–
	R22	–	–
	R23	QRD161J-473	CR, E/EG
	R24	–	–
	R25	QRD161J-471	CR, EK ONLY
	R26	QRD161J-681	CR, EK ONLY
	R27	QRD161J-681	CR, EK ONLY
	R28	QRD161J-391	CR, EK ONLY
	R29	QRD161J-332	CR, EK ONLY
	R30	QRD161J-821	CR, EK ONLY

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R31	QRD161J-102	CR, EK ONLY
	R32	QVZ3518-332	VR, EK ONLY, AUDIO LEVEL
	R33	QRD161J-562	CR, EK ONLY
	R34	QRD161J-103	CR, EK ONLY
	R35	QRD161J-182	CR, EK ONLY
	R36	–	–
	R37	–	–
	R38	–	–
	R39	–	–
	R40	QRD161J-182	CR
	R41	QRD161J-272	CR
	R42	QVZ3518-103	VR, COLOUR LEVEL
	R43	QRD161J-123	CR
	R44	QRD161J-123	CR
	R45	QRD161J-331	CR
	R46	QRD161J-222	CR
	R47	–	–
	R48	–	–
	R49	QRD161J-331	CR, E/EG
	R50	QRD161J-680	CR, E/EG
	R51	QRD161J-222	CR, E/EG
	R52	QRD161J-471	CR
	R53	QRD161J-103	CR
	R54	QRD161J-332	CR
	R55	QRD161J-680	CR
	R56	QRD161J-102	CR
	R57	QRD161J-471	CR
	R58	QRD161J-223	CR
	R59	QRD161J-223	CR
	R60	QRD161J-103	CR
	R61	QRD161J-334	CR
	R62	QRD161J-103	CR
	R75	QRD161J-472	CR, E/EG
	R76	QRD161J-153	CR, E/EG
	R77	QRD161J-123	CR, E/EG
	R78	QRD161J-472	CR, E/EG
	R79	QRD161J-153	CR, E/EG
	R80	QRD161J-123	CR, E/EG
	R81	QRD161J-472	CR, E/EG
		QRD161J-104	CR, EK
	R82	QRD161J-153	CR, E/EG
	R83	QRD161J-123	CR, E/EG
	R84	QRD161J-472	CR, E/EG
	R85	QRD161J-153	CR, E/EG
	R86	QRD161J-123	CR, E/EG
	R87	QRD161J-104	CR, E/EG
	R88	QRD161J-153	CR
	R89	QRD161J-752	CR, E/EG
	R90	QRD161J-101	CR
	R91	QRD161J-472	CR
	R92	QRD161J-562	CR
	R93	QRD161J-152	CR
	R94	QRD161J-472	CR
	R95	QRD161J-121	CR
	R96	QRD161J-103	CR
	R97	QRD161J-103	CR
	R98	QRD161J-153	CR
	R99	QRD161J-331	CR

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R100	QRD161J-101	CR
	R101	QRD161J-222	CR
	R102	QRD161J-222	CR
	R103	QRD161J-222	CR
	R104	QRD161J-222	CR
	R105	QRD161J-222	CR
	R106	QRD161J-102	CR
	R107	QRD161J-472	CR, E/EG
		QRD161J-222	CR, EK
	R108	QRD161J-103	CR, E/EG
	R109	–	–
	R110	QRD161J-104	CR
	R111	QRD161J-104	CR
	R112	QRD161J-222	CR
	R130	QRD161J-331	CR
	R131	QRD161J-102	CR
	R132	QRD161J-101	CR
	R133	QRD161J-153	CR
	R134	QRD161J-182	CR
	R140	QRD161J-392	CR, E/EG
	R141	QRD161J-222	CR, E/EG
	R142	QRD161J-331	CR, E/EG
	C1	QCSB1HJ-100	C CAP, E/EG
	C2	QCBB1HK-102	C CAP
	C3	QCXB1CK-222	C CAP
	C4	QCBB1HK-102	C CAP
	C5	QCBB1HK-102	C CAP
	C6	–	–
	C7	PU57601-474ME	OS CAP
	C8	QETC1CM-336	E CAP
	C9	QCXB1CK-222	C CAP
	C10	QCSB1HJ-470	C CAP, E/EG
		QCSB1HJ-220	C CAP, EK
	C11	QETC1HM-474	E CAP
	C12	QCT25PH-270	C CAP, E/EG
		QCT25RH-220	C CAP, EK
	C13	QCXB1CK-222	C CAP
	C14	QETC1CM-336	E CAP
	C15	–	–
	C16	–	–
	C17	–	–
	C18	–	–
	C19	QETC1CM-336	E CAP, EK ONLY
	C20	QCXB1CK-222	C CAP, EK ONLY
	C21	QCF31HP-223	C CAP, EK ONLY
	C22	QCSB1HJ-100	C CAP, EK ONLY
	C23	QETC1HM-105	E CAP
	C24	QFN31HK-393	MY CAP, EK ONLY
	C25	QETC1HM-105	E CAP, EK ONLY
	C26	–	–
	C27	QETC1HM-335	E CAP, EK ONLY
	C28	–	–
	C29	–	–
	C30	QETC1CM-336	E CAP

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C31	QCSB1HJ-470	C CAP
	C32	–	–
	C33	–	–
	C34	QETC1CM-336	E CAP, E/EG
	C35	QETC1CM-106	E CAP
	C36	QCC11EK-223	C CAP
	C37	QETC1HM-474	E CAP
	C38	–	–
	C39	QCC11CK-104	C CAP
	C40	QETC1CM-106	E CAP, E/EG
	C41	QETC1CM-106	E CAP, E/EG
	C42	QETC1CM-106	E CAP, E/EG
		QETC1HM-225	E CAP, EK
	C43	QETC1CM-106	E CAP
	C44	QETC1HM-225	E CAP, E/EG
	C45	–	–
	C46	QFV81HJ-474	MY CAP
	OR	QFZ9011-474	MP CAP
	C47	QFN31HJ-223	MY CAP, E/EG
		QFN31HK-223	MY CAP, EK
	C48	QCBB1HK-102	C CAP
	C49	QCBB1HK-102	C CAP
	C50	–	–
	C51	QCT25CH-220	C CAP
	C52	QCT25CH-270	C CAP
	C53	QCVB1CN-103	C CAP
	C54	–	–
	C55	QETC1CM-106	E CAP
	C56	QETC1CM-336	E CAP
	C57	QET61CM-337	E CAP, E/EG
	C58	QCBB1HK-102	C CAP
	C59	QETC1AM-336	E CAP, E/EG
		QET61AM-336	E CAP, EK
	C60	–	–
	C61	QET61AM-106	E CAP
	C62	–	–
	C63	QETC1HM-106	E CAP
	C64	PU57601-475MA	OS CAP
	C65	QETC1CM-336	E CAP
	C66	–	–
	C67	–	–
	C68	–	–
	C69	–	–
	C70	QCXB1CK-222	C CAP, E/EG
	C71	QCBB1HK-102	C CAP, E/EG
	L1	PU59152-R22M	PEAKING COIL, E/EG
	L2	PU57717-1R0J	PEAKING COIL, E/EG
		PU57717-1R2	PEAKING COIL, EK
	L3	PU57717-1R5J	PEAKING COIL, E/EG
		PU57717-1R5	PEAKING COIL, EK
	L4	PU59152-6R8K	PEAKING COIL
	L5	PU59152-120J	PEAKING COIL, E/EG
		PU59152-150J	PEAKING COIL, EK
	L6	PU59152-6R8K	PEAKING COIL
	L7	PU59152-6R8K	PEAKING COIL, EK ONLY
	L8	PU59152-220J	PEAKING COIL
	L9	–	–
	L10	PU59152-100J	PEAKING COIL

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	L11	PU59152-R22K	PEAKING COIL, E/EG
	OR	PU53223-R22K	PEAKING COIL, E/EG
⚠	T1	PU59402	TRAP COIL, FTZ TRAP, E/EG
	T2	PU59308	COIL, VCO
	T3	–	–
	T4	PU59644	F.H. TRAP, EK ONLY
	T5	PU59639	IFT, SYNC DET
	CF1	PU57707	CERAMIC FILTER, EK ONLY
	CF2	PU59242-3	CERAMIC FILTER, EK ONLY, 6.0 MC29
⚠	CF3	PU32990-2	CERAMIC FILTER, E/EG
		PU32990-3	CERAMIC FILTER, EK, T 6.0
	RA1	QRB047J-104	RESISTOR ARRAY
⚠	CP1	ICP-F15	CIRCUIT PROTECTOR
	SAW1	PU35557-4	SAW FILTER, E/EG
		PU32987-4	SAW FILTER, EK
⚠	X1	PU58554-2	CRYSTAL, 4.0 MHz
⚠	TNR	PU36155-1-2	U/V TUNER, E/EG
⚠		PU36180	UHF TUNER, EK
	SLD1	PU36322	SHIELD CASE
	SLD2	PQ31328-1-1	SHIELD COVER
	SLD3	PU59761-1-1	SHIELD PLATE
	SPC1	PQM30029-87	SPACER
		PU57295-022	COAXIAL CORD, EK ONLY
⚠	RF1	PU59429M	RF CONVERTER & MIX BOOSTER, E/EG
⚠		PU58053S-03	RF CONVERTER & MIX BOOSTER, EK
	CN1	PU58844-7	CAP. HOUSING
	CN2	PU58844-3	CAP. HOUSING, E/EG
		PU58844-5	CAP. HOUSING, EK
	CN3	PU58844-3R	CAP. HOUSING, E/EG
	CN4	PU58844-3	CAP. HOUSING, E/EG
	CN5	PU58844-4	CAP. HOUSING
	CN6	–	–
	CN7	PU59374	CAP. HOUSING, E/EG

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU11433D (E/EG)	AUDIO (FMA/NOR) BOARD ASS'Y [09]
		PU11433C (EK)	AUDIO (FMA/NOR) BOARD ASS'Y [09]
	IC1	AN6299K	INTEGRATED CIRCUIT
	IC2	AN3926K	INTEGRATED CIRCUIT
	IC3	HA11752	INTEGRATED CIRCUIT
	IC4	AN3930K	INTEGRATED CIRCUIT
	IC5	H8D1951A	INTEGRATED CIRCUIT
	IC6	AN3994NK	INTEGRATED CIRCUIT
	IC7	BA3707	INTEGRATED CIRCUIT
	Q1	DTA143EF	D. TRANSISTOR
⚠	Q2	2SD973R	TRANSISTOR
	Q3	2SB643R,S	TRANSISTOR
	Q4	DTC144EF	D. TRANSISTOR
⚠	Q5	2SA854S(QR)	TRANSISTOR
⚠	Q6	2SD973R	TRANSISTOR
⚠	Q7	2SA854S(QR)	TRANSISTOR
	Q8	DTA114YF	D. TRANSISTOR
	Q9	2SB643Q,R,S	TRANSISTOR
	Q10	2SD638Q,R,S	TRANSISTOR
	Q11	2SC2021R,S	TRANSISTOR
	Q12	2SC2021R,S	TRANSISTOR
	Q13	2SC2021R,S	TRANSISTOR
	Q14	2SC2021R,S	TRANSISTOR
	Q15	2SC2021Q,R,S	TRANSISTOR
	Q16	2SC2021Q,R,S	TRANSISTOR
	Q17	2SC2021R,S	TRANSISTOR
	Q18	DTA114YF	D. TRANSISTOR
	Q19	DTA114YF	D. TRANSISTOR
	Q20	2SD958S,T	TRANSISTOR
	Q21	2SD958S,T	TRANSISTOR
⚠	Q22	DTA114EN	D. TRANSISTOR
	Q23	2SD636Q,R,S	TRANSISTOR
	Q24	DTA114YF	D. TRANSISTOR
	D1	1SS133	DIODE
	OR	MA165	DIODE
	D2	1SS133	DIODE
	OR	MA165	DIODE
	D3	1SS133	DIODE
	OR	MA165	DIODE
	D4	1SS133	DIODE
	OR	MA165	DIODE
	D5	–	–
	D6	1SS133	DIODE
	OR	MA165	DIODE
	D7	1SS133	DIODE
	OR	MA165	DIODE
	D8	1SS133	DIODE
	OR	MA165	DIODE
	D9	1SS133	DIODE
	OR	MA165	DIODE
	D10	1SS133	DIODE
	OR	MA165	DIODE
	D11	1SS133	DIODE
	OR	MA165	DIODE

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	D12	1SS133	DIODE
	OR	MA165	DIODE
	D13	1SS133	DIODE
	OR	MA165	DIODE
	D14	1SS133	DIODE
	OR	MA165	DIODE
	D15	–	–
	D16	1SS133	DIODE
	OR	MA165	DIODE
	D17	1SS133	DIODE
	OR	MA165	DIODE
	R1	QRD161J-103	CR
	R2	QRD161J-103	CR
	R3	–	–
	R4	–	–
	R5	–	–
	R6	–	–
	R7	QRD161J-331	CR
	R8	QRD161J-392	CR
	R9	QRD161J-272	CR
	R10	QRD161J-152	CR
	R11	QRD161J-182	CR
	R12	QRD161J-392	CR
	R13	QRD161J-821	CR
	R14	QRD161J-682	CR
	R15	QRD161J-123	CR
	R16	QRD161G-513	CR
	R17	QRD161J-123	CR
	R18	QRD161J-153	CR
	R19	QRD161J-272	CR
	R20	QRD161J-152	CR
	R21	QRD161J-182	CR
	R22	QRD161J-392	CR
	R23	QRD161J-821	CR
	R24	QRD161J-682	CR
	R25	QRD161J-123	CR
	R26	QRD161G-513	CR
	R27	QRD161J-153	CR
	R28	QRD161J-123	CR
	R29	QRD161J-102	CR
	R30	QRD161J-151	CR
	R31	QRD161J-225	CR
	R32	QVZ3518-472	VR, L IND LEVEL
	R33	QRD161J-392	CR
	R34	–	–
	R35	QRD161J-473	CR
	R36	QRD161J-102	CR
	R37	QRD161J-151	CR
	R38	QRD161J-225	CR
	R39	QVZ3518-472	VR, R IND LEVEL
	R40	QRD161J-102	CR
	R41	QRD161J-102	CR
	R42	QRD161J-102	CR
	R43	QRD161J-222	CR
	R44	QRD161J-222	CR
	R45	QRD161J-102	CR
	R46	QRD161J-100	CR
	R47	QRD161J-100	CR

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R48	QRD161J-152	CR
	R49	QRD161J-472	CR
	R50	QRD161J-332	CR
	R51	QRD161J-332	CR
	R52	QRD161J-152	CR
	R53	QRD161J-102	CR
	R54	QVZ3518-332	VR, REC FM LEVEL
	R55	QRD161J-103	CR
	R56	QRD161J-392	CR
	R57	QRD161J-392	CR
	R58	QRD161J-271	CR
	R59	QRD161J-152	CR
	R60	QRD161J-100	CR
	R61	QRD161J-100	CR
	R62	QRD161J-681	CR
	R63	QRD161J-681	CR
	R64	QRD161J-223	CR
	R65	QRD161J-223	CR
	R66	QRD161J-681	CR
	R67	QRD161J-224	CR
	R68	QRD161J-223	CR
	R69	QRD161J-562	CR
	R70	QRD161J-472	CR
	R71	QRD161J-821	CR
	R72	QRD161J-471	CR
	R73	QRD161J-102	CR
	R74	QRD161J-102	CR
	R75	QRD161J-683	CR
	R76	QRD161J-103	CR
	R77	–	–
	R78	QRD161J-332	CR
	R79	QRD161J-271	CR
	R80	–	–
	R81	–	–
	R82	–	–
	R83	QRD161J-562	CR
	R84	QRD161J-182	CR
	R85	QRD161G-162	CR
	R86	–	–
	R87	QRD161J-224	CR
	R88	QRD161J-752	CR
	R89	QVZ3520-332	VR, L fo (1.4 MHz)
	R90	QRD161J-472	CR
	R91	QRD161J-182	CR
	R92	QRD161J-102	CR
	R93	QRD161J-102	CR
	R94	QRD161J-182	CR
	R95	QVZ3520-332	VR, R fo (1.8 MHz)
	R96	QRD161J-332	CR
	R97	QRD161J-272	CR
	R98	QRD161G-162	CR
	R99	QRD161J-182	CR
	R100	QRD161J-562	CR
	R101	QRD161J-224	CR
	R102	QRD161J-222	CR
	R103	QVZ3518-103	VR, L PB LEVEL
	R104	QRD161J-334	CR
	R105	QRD161J-333	CR
	R106	QRD161J-222	CR

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R107	QVZ3518-103	VR, R PB LEVEL
	R108	–	–
	R109	QRD161J-563	CR
	R110	QRD161J-472	CR
	R111	QRD161J-223	CR
	R112	QRD161J-102	CR
	R113	QRD161J-103	CR
	R114	QRD161J-103	CR
	R115	–	–
	R116	QRD161J-472	CR
	R117	QRD161J-103	CR
	R118	QRD161J-274	CR
	R119	QRD161J-331	CR
	R120	QVZ3518-102	VR, NORMAL PB LEVEL
	R121	QRD161J-333	CR
	R122	QRD161J-471	CR
	R123	QRD161J-333	CR
	R124	QRD161J-331	CR
	R125	QRD161J-470	CR
	R126	QRD161J-100	CR
	R127	QRD161J-361	CR
	R128	QVZ3518-473	VR, BIAS LEVEL
	R129	QRD161J-333	CR
	R130	QRD161J-4R7	CR
	R131	QRD161J-102	CR
	R132	QRD161J-224	CR
	R133	QRD161J-104	CR
	R134	QRD161J-822	CR
	R135	QRD161J-223	CR
	R136	QRD161J-152	CR
	R137	QRD161J-102	CR
	R138	QRD161J-104	CR
	R139	QRD161J-102	CR
	R140	QRD161J-104	CR
	R141	QRD161J-223	CR
	R142	QRD161J-122	CR
	R143	QRD161J-102	CR
	R144	QRD161J-333	CR
	R145	QRD161J-823	CR
	R146	QRD161J-184	CR
	R147	QVZ3518-473	VR, R CH E-E
	R148	QVZ3518-473	VR, L CH E-E
	R149	QRD161J-223	CR
	R150	QRD161J-272	CR
	R151	–	–
	R152	–	–
	R153	–	–
	R154	–	–
	R155	QRD161J-124	CR
	R156	QRD161J-103	CR
	R157	QRD161J-103	CR
	R158	QRD161J-472	CR
	R159	QRD161J-472	CR
	R160	–	–
	R161	QRD161J-683	CR
	R162	QRD161J-563	CR
	R163	QRD161J-8R2	CR
	R164	QRD161J-102	CR
	R165	QRD161J-102	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R166	QRD161J-102	CR
	R167	QRD161J-334	CR
	R168	QRD161J-124	CR
	R169	QRD161J-272	CR
⚠	R170	QRD161J-331	CR
	R171	QRD161J-223	CR
⚠	R172	QRD161J-122	CR
	R173	QRD161J-103	CR
	R174	QRD161J-562	CR
	R175	QRD161J-103	CR
	R176	QRD161J-682	CR
	R177	QRD161J-472	CR
	R178	QRD161J-122	CR
	R179	QRD161J-122	CR
	R180	QRD161J-472	CR
	R181	QRD161J-682	CR
⚠	R201	QRZ0052-100	FR
⚠	R202	QRD161J-102	CR
⚠	R203	PU52108-6R8K	POSISTOR
⚠	OR	PU52108-6R8	POSISTOR
	C1	QETC1EM-335	E CAP
	C2	QETC1CM-107	E CAP
	C3	QETC1HM-225	E CAP
	C4	QETC1CM-107	E CAP
	C5	QETC1HM-225	E CAP
	C6	QETC1CM-106	E CAP
	C7	–	–
	C8	QFN31HJ-103	MY CAP
	C9	QFN31HJ-122	MY CAP
	C10	QETC1CM-106	E CAP
	C11	QCS31HJ-151	C CAP
	C12	QETC1AM-336	E CAP
	C13	QFN31HJ-333	MY CAP
	C14	QETC1AM-336	E CAP
	C15	QETC1HM-225	E CAP
	C16	QETC1AM-336	E CAP
	C17	QETC1AM-336	E CAP
	C18	QFN31HJ-153	MY CAP
	C19	–	–
	C20	QETC1CM-476	E CAP
	C21	QETC1HM-225	E CAP
	C22	QETC1HM-225	E CAP
	C23	QETC1CM-106	E CAP
	C24	–	–
	C25	QETC1CM-106	E CAP
	C26	QFN31HJ-122	MY CAP
	C27	QFN31HJ-103	MY CAP
	C28	QFN31HJ-151	MY CAP
	C29	QETC1AM-336	E CAP
	C30	QFN31HJ-333	MY CAP
	C31	QETC1AM-336	E CAP
	C32	QETC1HM-225	E CAP
	C33	QETC1AM-336	E CAP
	C34	QETC1AM-336	E CAP
	C35	QFN31HJ-153	MY CAP

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C36	QCF31HP-103	C CAP
	C37	QETC1CM-336	E CAP
	C38	QETC1CM-106	E CAP
	C39	QETC1CM-106	E CAP
	C40	QETC1CM-106	E CAP
	C41	QETC1HM-105	E CAP
	C42	QETC1HM-335	E CAP
	C43	QETC1HM-105	E CAP
	C44	QETC1HM-335	E CAP
	C45	QETC1CM-106	E CAP
	C46	QCF31HP-103	C CAP
	C47	QETC1CM-476	E CAP
	C48	QETC1CM-336	E CAP
	C49	QETC1CM-106	E CAP
	C50	QETC1CM-106	E CAP
	C51	QETC1CM-106	E CAP
	C52	QETC1CM-106	E CAP
	C53	QETC1AM-476	E CAP
	C54	QCF31HP-102	C CAP
	C55	QETC1CM-476	E CAP
	C56	QCF31HP-103	C CAP
	C57	QCF31HP-103	C CAP
	C58	QCF31HP-103	C CAP
	C59	QCF31HP-103	C CAP
	C60	–	–
	C61	QCF31HP-103	C CAP
	C62	QCF31HP-103	C CAP
	C63	QCF31HP-103	C CAP
	C64	QCF31HP-103	C CAP
	C65	QCF31HP-103	C CAP
	C66	QCF31HP-103	C CAP
	C67	QCS31HJ-561	C CAP
	C68	QCS31HJ-561	C CAP
	C69	QCF31HP-223	C CAP
	C70	QCF31HP-223	C CAP
	C71	QCF31HP-103	C CAP
	C72	QETC1AM-476	E CAP
	C73	QCF31HP-102	C CAP
	C74	QCS31HJ-331	C CAP
	C75	QCF31HP-103	C CAP
	C76	QCF31HP-103	C CAP
	C77	QCF31HP-103	C CAP
	C78	QETC1AM-476	E CAP
	C79	–	–
	C80	QCF31HP-103	C CAP
	C81	QETC1HM-105	E CAP
	C82	–	–
	C83	QFN31HJ-103	MY CAP
	C84	–	–
	C85	QETC1AM-336	E CAP
	C86	QCT25CH-101	C CAP
	C87	QFN31HJ-182	MY CAP
	C88	QETC1AM-336	E CAP
	C89	QCF31HP-103	C CAP
	C90	QCF31HP-103	C CAP
	C91	QFN31HJ-182	MY CAP
	C92	QETC1AM-336	E CAP
	C93	QCT25CH-101	C CAP
	C94	–	–

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C95	QETC1AM-336	E CAP
	C96	QFN31HJ-103	MY CAP
	C97	QETC1AM-336	E CAP
	C98	QFN31HJ-392	MY CAP
	C99	QCS31HJ-121	C CAP
	C100	QETC1AM-107	E CAP
	C101	QETC1EM-335	E CAP
	C102	QFN31HJ-392	MY CAP
	C103	QETC1AM-336	E CAP
	C104	QETC1EM-335	E CAP
	C105	QETC1HM-105	E CAP
	C106	QETC1HM-225	E CAP
	C107	QFN31HJ-103	MY CAP
	C108	QFN31HJ-224	MY CAP
	C109	QETC1CM-226	E CAP
	C110	QCF31HP-102	C CAP
	C111	QETC1HM-105	E CAP
	C112	QFN31HJ-152	MY CAP
	C113	QETC1CM-476	E CAP
	C114	–	–
	C115	QFV71HJ-683	MY CAP
	C116	QER61CM-106	E CAP
	C117	QFN31HJ-683	MY CAP
	C118	QETC1CM-106	E CAP
	C119	QETC1HM-225	E CAP
	C120	QETC0JM-107	E CAP
	C121	QETC1AM-476	E CAP
	C122	QFP32AJ-683	PP CAP
	C123	QCS31HJ-331	C CAP
	C124	QFN31HJ-332	MY CAP
	C125	QFN31HJ-822	MY CAP
	C126	QETC1HM-225	E CAP
	C127	QEK61CM-106	E CAP
	C128	QEK61HM-474	E CAP
	C129	QETC1HM-105	E CAP
	C130	QETC1HM-474	E CAP
	C131	QCF31HP-103	C CAP
	C132	QFN31HJ-332	MY CAP
	C133	QFN31HJ-332	MY CAP
	C134	QETC1HM-224	E CAP
	C135	QFN31HJ-563	MY CAP
	C136	–	–
	C137	–	–
	C138	–	–
	C139	–	–
	C140	QCS31HJ-390	C CAP
	C141	QCF31HP-103	C CAP
	C142	–	–
	C143	QETC1CM-106	E CAP
	C144	QETC1CM-107	E CAP
	C145	QETC1CM-106	E CAP
	C146	QETC1CM-106	E CAP
	C147	QETC1EM-335	E CAP
	C148	QETC1CM-106	E CAP
	L1	PU58308-152J	COIL
	L2	PU58308-152J	COIL
	L3	PU54223-101JG	PEAKING COIL
	L4	PU54223-221JG	PEAKING COIL
	L5	PU54223-101JG	PEAKING COIL
	L6	PU58308-222J	COIL
	L7	PU58308-222J	COIL
	L8	PU58308-272J	COIL
	L13	PU49993-3R9	COIL, E/EG
	T1	PU59307-2	OSC TRANS
	BPF1	PU58494-2	BAND PASS FILTER
	BPF2	PU58494	BAND PASS FILTER
	SLD1	PQ42333-1-1	SHIELD CASE (1)
	SLD2	PQ42334	SHIELD CASE (2)
	SLD3	PQ42335	SHIELD CASE (3)
	SLD4	PQ42336-1-1	BIAS SHIELD (1)
	SLD5	PQ42337	BIAS SHIELD (2)
	TP	PU55774	TEST PIN, TP1–6, GND
	CN1	–	–
	CN2	PU58844-3	CAP. HOUSING, 1–3, E/EG
		PU58844-2	CAP. HOUSING, 1–2, EK
	CN3	PU58844-5	CAP. HOUSING
	CN4	PU58844-5	CAP. HOUSING
	CN5	PU58844-8	CAP. HOUSING
	CN6	PU58844-3	CAP. HOUSING
	CN7	PU49215-7	CAP. HOUSING
	CN8	PU58844-4	CAP. HOUSING
	CN9	–	–
	CN10	PU58844-6	CAP. HOUSING, 1–6
	CN11	PU58844-5	CAP. HOUSING
	CN12	PU58844-2	CAP. HOUSING
	CN13	–	–
	CN14	PU58844-3Y	CAP. HOUSING
	CN15	PU58844-3R	CAP. HOUSING
	CN16	–	–
	CN17	PU58844-2	CAP. HOUSING, E/EG

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A/CTL HEAD BOARD [12]

	PWB	PU58016	A/CTL HEAD BOARD
	CN1	PU54537-5	CAP. HOUSING
	CN2	PU54537-2	CAP. HOUSING
	BKT1	PQ42518	BRACKET
	SCR1	SPSH1740	MINI SCREW

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22418A-02 (E/EG ONLY)	DEMODULATOR BOARD ASS'Y [14]
⚠	IC1	M51365SP	INTEGRATED CIRCUIT
	IC2	TDA3800GS	INTEGRATED CIRCUIT
	Q1	2SC2655O,Y	TRANSISTOR
		OR 2SD1292Q,R	TRANSISTOR
	Q2	–	–
	Q3	2SC3354S,T	TRANSISTOR
	Q4	2SC3354S,T	TRANSISTOR
	Q11	DTC114ES	D. TRANSISTOR
	Q12	DTC114ES	D. TRANSISTOR
	Q13	DTC114ES	D. TRANSISTOR
	Q14	DTC114ES	D. TRANSISTOR
	Q15	2SD1450S,T	TRANSISTOR
	Q16	2SD1450S,T	TRANSISTOR
	Q17	2SC3311AR,S	TRANSISTOR
	Q18	2SC3311AR,S	TRANSISTOR
	Q19	DTC144ES	D. TRANSISTOR
	Q20	DTC114ES	D. TRANSISTOR
	D1	–	–
	D2	1SS133	DIODE
	D3	–	–
	D4	–	–
	D5	1SS133	DIODE
	D6	1SS133	DIODE
	D7	1SS133	DIODE
	R1	QRD161J-561	CR
	R9	QRD161J-331	CR
	R10	–	–
	R11	QRD161J-561	CR
	R12	QRD161J-101	CR
	R13	QRD161J-330	CR
	R14	QRD161J-101	CR
	R15	QRD161J-471	CR
	R16	QRD161J-821	CR
	R17	–	–
	R18	QRD161J-824	CR
	R19	–	–
	R20	–	–
	R21	QRD161J-822	CR
	R22	QRD161J-222	CR
	R23	QRD161J-272	CR
	R24	QRD161J-223	CR
	R25	–	–
	R26	QRD161J-470	CR
	R27	QRD161J-561	CR
	R28	–	–
	R29	–	–
	R30	–	–
	R31	QVZ3518-103	VR, SEPARATION
	R32	QRD161J-331	CR
	R33	QRD161J-331	CR
	R34	–	–
	R35	–	–
	R36	QRD161J-471	CR
	R42	QRD161J-103	CR
	R43	QRD161J-103	CR
	R44	QRD161J-123	CR
	R45	QRD161J-821	CR
	R46	QRD161J-102	CR
	R47	–	–
	R48	QRD161J-273	CR
	R49	–	–
	R50	–	–
	R51	QRD161J-103	CR
	R52	QRD161J-103	CR
	R53	QRD161J-331	CR
	R54	QRD161J-103	CR
	R55	QRD161J-103	CR
	R56	QRD161J-331	CR
	R57	QVZ3518-332	VR, L LEVEL
	R58	QRD161J-472	CR
	R59	QRD161J-103	CR
	R60	–	–
	R61	–	–
	R62	QVZ3518-332	VR, R LEVEL
	R63	QRD161J-472	CR
	R64	QRD161J-103	CR
	R65	–	–
	R66	QRD161J-821	CR
	R67	QRD161J-821	CR
	R73	QRD161J-224	CR
	R74	QRD161J-394	CR
	R75	QRD161J-103	CR
	R76	QRD161J-104	CR
	R77	–	–
	R78	QRD161J-820	CR
	R84	QRD161J-103	CR
	R85	–	–
	R86	QRD161J-101	CR
	C1	QCBB1HK-102	C CAP
	C2	QETC1CM-476	E CAP

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C12	QCXB1CN-222	C CAP
	C13	QCBB1HK-102	C CAP
	C14	QCXB1CN-222	C CAP
	C15	QCC11EK-473	C CAP
	C16	QETC1CM-336	E CAP
	C17	QCXB1CN-222	C CAP
	C18	–	–
	C19	QETC1HM-474	E CAP
	C20	–	–
	C21	QCXB1CN-222	C CAP
	C22	QETC1CM-336	E CAP
	C23	QCVB1CN-103	C CAP
	C24	QCBB1HJ-101	C CAP
	C25	–	–
	C26	QETC1CM-106	E CAP
	C27	QETC1HM-105	E CAP
	C28	QCXB1CN-222	C CAP
	C29	QETC1CM-476	E CAP
	C30	QETC1CM-106	E CAP
	C31	QCT25PH-270	C CAP
	C32	QETC1HM-474	E CAP
	C33	–	–
	C34	–	–
	C35	–	–
	C36	–	–
	C37	QFN31HK-392	MY CAP
	C38	QFN31HK-392	MY CAP
	C39	QFN31HK-392	MY CAP
	C40	–	–
	C41	QETC1CM-106	E CAP
	C42	QETC1CM-106	E CAP
	C43	QETC1CM-476	E CAP
	C44	QCF31HP-223	C CAP
	C45	QCC11EK-473	C CAP
	C46	QFP31HJ-102	PP CAP
	C47	QETA1CM-477	E CAP
	C48	–	–
	C49	QEU51CM-108	E CAP
	C50	QCXB1CM-222	C CAP
	C51	QCC11EK-473	C CAP
	C52	QETC1CM-106	E CAP
	C53	QETC1CM-106	E CAP
	C54	QETC1HM-105	E CAP
	C63	QETC1CM-336	E CAP
	C64	QETC1CM-476	E CAP
	C65	QFN31HJ-123	MY CAP
	C66	QFN31HJ-123	MY CAP
	L1	PU57717-1R0	PEAKING COIL
	L2	PU57717-1R5	PEAKING COIL
	L3	PU59152-6R8J	PEAKING COIL
	L4	PU59152-6R8J	PEAKING COIL
	L5	–	–
	L6	PU59152-6R8J	PEAKING COIL
	L7	–	–
	L8	–	–
	L9	PU59152-221J	PEAKING COIL

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	CF1	PU49295	CERAMIC FILTER, 5.5 MHz
	CF2	PU49295-2	CERAMIC FILTER, 5.5 MHz
	CF3	–	–
	CF4	PU52775	CERAMIC FILTER, 5.74 MHz
	CF5	PU52775-2	CERAMIC FILTER, 5.74 MHz
	BPF1	PU58226	BAND PASS FILTER
	SAW1	PU32987-7	SAW FILTER
	T3	PU59488	COIL, 5.5 MHz DET
	T4	PU59308	COIL, VCO
	T5	PU59489	COIL, 5.74 MHz DET
	T6	PU59490	COIL, 54.7 kHz DET
	T7	PU59243	F.H. TRAP
	T8	PU59243	F.H. TRAP
	J1	PU36069-006	FLAT WIRE
	CN1	PU58844-3	CAP. HOUSING
	CN2	PU58844-3Y	CAP. HOUSING
	CN3	PU58844-3R	CAP. HOUSING
	CN4	PU59374	JACK

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PU22390B-01(E/EG) JUNCTION BOARD ASS'Y [16]
PU22390A-01(EK) JUNCTION BOARD ASS'Y [16]

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R1	QRD161J-472	CR
	R2	QRD161J-472	CR
	R3	QRD161J-472	CR
	R4	QRD161J-472	CR
	R5	QRD161J-472	CR
	R6	QRD161J-472	CR
	R7	QRD161J-472	CR
	R8	QRD161J-472	CR
	R9	QRD161J-472	CR, E/EG
	R10	QRD161J-472	CR, E/EG
	CN1	PU59414-30	FFC CONNECTOR
	CN2	PU59414-30	FFC CONNECTOR
	CN3	PU58844-107R	CAP. HOUSING
	CN4	PU58844-112	CAP. HOUSING
	CN5	PU58844-103	CAP. HOUSING, E/EG
	CN6	PU58844-109	CAP. HOUSING
	CN7	PU58844-107	CAP. HOUSING
	CN8	–	–
	CN9	PU58844-105	CAP. HOUSING

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	CN10	PU58844-102	CAP. HOUSING, E/EG
	CN11	PU58844-104	CAP. HOUSING, E/EG
	CN12	PU58844-102R	CAP. HOUSING, E/EG
		PU58844-102	CAP. HOUSING, EK ONLY
	CN13	PU58844-106	CAP. HOUSING
	CN14	PU58844-103	CAP. HOUSING

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#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU36127B-1(E/EG)	VPS BOARD ASS'Y [18]
	IC1	HD49703NT	INTEGRATED CIRCUIT
⚠	IC2	M5278L05	INTEGRATED CIRCUIT
	Q1	2SB641R,S	TRANSISTOR
	Q2	2SC3327A	TRANSISTOR
	OR	2SC2878A	TRANSISTOR
	Q3	2SD637R,S	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	1SS133	DIODE
	D5	1SS133	DIODE
	R1	QRD161J-103	CR
	R2	QRD161J-103	CR
	R3	QRD161J-102	CR
	R4	QRD161J-102	CR
	R5	QRD161J-102	CR
	R6	QRD161J-473	CR
	R7	QRD161J-103	CR
	R8	QRD161J-391	CR
	R9	QRD161J-562	CR
	R10	QRD161J-102	CR
	R11	QRD161J-473	CR
	R12	QRD161J-562	CR
	R13	QRD161J-105	CR
	R14	QRD161J-472	CR
	R15	QRD161J-472	CR
	R16	QRD161J-472	CR
	R17	QRD161J-472	CR
	R18	QRD161J-562	CR
	R19	QRD161J-563	CR
	R20	QRD161J-222	CR
	R21	QRD161J-222	CR
	R22	QRD161J-222	CR
	R23	QRD161J-222	CR
	R24	QRD161J-472	CR
	R25	QRD161J-682	CR
	R26	QRD161J-472	CR
	R27	QRD161J-102	CR
	R28	QRD161J-103	CR
	R29	QRD161J-103	CR
	R30	QRD161J-184	CR
	R31	QRD161J-103	CR
	R32	QRD161J-332	CR
	R33	QRD161J-561	CR
	R34	QRD161J-474	CR
	R35	QRD161J-474	CR
	R36	QRD161J-332	CR
	R37	QRD161J-103	CR
	C1	QETC1CM-336	E CAP
	C2	QCS31HJ-681	C CAP
	C3	QETC1CM-106	E CAP
	C4	QCS31HJ-391	C CAP
	C5	QCT25CH-390	C CAP
	C6	QFN31HJ-103	MY CAP
	C7	QFN31HJ-102	MY CAP
	C8	QFN31HJ-102	MY CAP
	C9	QETC1CM-336	E CAP
	C10	QETC1CM-336	E CAP
	C11	QCF31HP-473	C CAP
	C12	QETC1CM-336	E CAP
	C13	QETC1CM-336	E CAP
	C14	QETC1CM-336	E CAP
	C15	QCS31HJ-391	C CAP
	C16	QETC1HM-335	E CAP
	C17	QETC1HM-105	E CAP
	C18	QETC1HM-106	E CAP
	C19	QCT25CH-390	C CAP
	C20	QCT25CH-150	C CAP
	C21	QETC1CM-336	E CAP
	C22	QCT25CH-100	C CAP
	T1	PU58484	COIL, OSC, TIMING
	RA1	RNBH5A224	RESISTOR NETWORK
	CN1	PU58844-3	CAP. HOUSING
	CN2	PU58844-4	CAP. HOUSING
	TP	PU56008	TEST PIN, TP1–6

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#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22415B3-04(E/EG)	POWER TRANSISTOR BOARD ASS'Y[19]
		PU22415A3-04(EK)	POWER TRANSISTOR BOARD ASS'Y[19]
	Q1	2SD1740-01	TRANSISTOR
	Q2	2SD1740-01	TRANSISTOR
	Q3	–	–
	Q4	2SD1740-01	TRANSISTOR
⚠	HTS1	PQ31378	HEAT SINK
	SCR1	DPSP3010Z	SCREW, X3, FOR Q1, Q2, Q4

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#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU11473C1-02(E)	FRONT BOARD ASS'Y [21]
		PU11473B1-02(EG)	FRONT BOARD ASS'Y [21]
		PU11473A1-02(EK)	FRONT BOARD ASS'Y [21]
⚠	IC1	UPD75208CW-030	INTEGRATED CIRCUIT
	IC2	UPD82C43CY	INTEGRATED CIRCUIT
	IC3	S-8053HLB	INTEGRATED CIRCUIT
⚠	IC4	M5278L56	INTEGRATED CIRCUIT
	IC101	MSC1124BRS	INTEGRATED CIRCUIT
	IC201	LA7224	INTEGRATED CIRCUIT, E/EG
	IC201	LA7225	INTEGRATED CIRCUIT, EK
	Q1	DTC124ES	D. TRANSISTOR
	Q2	DTA114ES	D. TRANSISTOR
	Q3	DTC124ES	D. TRANSISTOR
	Q4	DTC124ES	D. TRANSISTOR
	Q5	DTC124ES	D. TRANSISTOR
	Q6	2SC1685R,S	TRANSISTOR
	Q7	–	–
	Q8	–	–
	Q9	–	–
	Q10	2SC1685R,S	TRANSISTOR
	Q11	2SC1685R,S	TRANSISTOR
	Q12	DTC124ES	D. TRANSISTOR
	D1	1SS132	DIODE
	D2	1SS132	DIODE
	D3	1SS132	DIODE
	D4	1SS132	DIODE
	D5	1SS132	DIODE
	D6	1SS132	DIODE
	D7	1SS132	DIODE
	D8	1SS132	DIODE
	D9	1SS132	DIODE
	D10	1SS132	DIODE
	D11	1SS132	DIODE
	D12	–	–
	D13	–	–
	D14	1SS132	DIODE
	D15	–	–
	D16	–	–
	D17	RD8.2EB3	ZENER DIODE
	D18	RD9.1ES-T1B2	ZENER DIODE
	D19	1SS133	DIODE
	D20	1SS133	DIODE
	D21	1SS133	DIODE
	D22	1SS132	DIODE
	D23	1SS132	DIODE
	D24	1SS132	DIODE
	D25	RD7.5ES-T1B1	ZENER DIODE
⚠	D101	HZ24-2L	ZENER DIODE
	D201	SLP-981C-50	LED, OPERATE
	D208	SLP-981C-50	LED, HI-FI STEREO
	D209	SLP-981C-50	LED, NORMAL
	D210	SLP-981C-50	LED, L-CH
	D211	SLP-981C-50	LED, R-CH
	D212	SLP-981C-50	LED, STEREO, E/EG
	D213	SLP-981C-50	LED, BILINGUAL, E/EG
	D214	–	–
	D215	SLP-981C-50	LED, SC
	D216	–	–
	D217	–	–
	D218	–	–
	D219	–	–
	D220	PD49PI	PIN PHOTO DIODE
	D221	1SS133	DIODE
	D222	1SS133	DIODE
	R1	QRD161J-472	CR
	R2	QRD161J-472	CR
	R3	QRD161J-472	CR
	R4	QRD161J-472	CR
	R5	QRD161J-334	CR
	R6	QRD161J-682	CR
	R14	QRD161J-333	CR
	R15	QRD161J-333	CR
	R16	QRD161J-273	CR
	R17	QRD161J-472	CR
	R18	QRD161J-471	CR
	R19	QRD161J-103	CR
	R20	QRD161J-103	CR
	R21	QRD161J-103	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R22	QRD161J-472	CR
	R23	QRD161J-472	CR
	R24	QRD161J-472	CR
	R25	QRD161J-472	CR
	R26	QRD161J-103	CR
	R27	QRD161J-102	CR
	R28	QRD161J-472	CR
	R29	QRD161J-152	CR
	R30	QRD161J-222	CR
	R31	QRD161J-333	CR
	R32	QRD161J-472	CR
	R33	QRD161J-472	CR
	R34	QRD161J-472	CR
	R35	QRD161J-472	CR
	R36	–	–
	R37	QRD161J-471	CR
	R38	QRD161J-151	CR
	R39	QRD161J-102	CR
	R40	QRD161J-474	CR
	R41	QRD161J-684	CR
	R42	QRD161J-332	CR
	R43	QRD161J-104	CR
	R44	QRD161J-102	CR
	R45	QRD161J-472	CR
	R46	QRD161J-104	CR
	R47	–	–
	R48	QRD161J-104	CR
	R101	QRD161J-104	CR
	R102	QRD161J-151	CR
	R103	QRD161J-103	CR
	R104	QRD161J-104	CR
	R105	QRD161J-151	CR
	R106	QRD161J-103	CR
	R107	QRD161J-103	CR
	R108	QRD161J-103	CR
	R109	QRD161J-103	CR
	R201	QRD161J-681	CR, EK ONLY
	R202	QRD161J-104	CR
	R203	QRD161J-223	CR
	R204	QRD161J-104	CR
	R205	QRD161J-120	CR
	R206	QRD161J-102	CR
	R207	QRD161J-152	CR
	R208	QRD161J-222	CR
	R209	QRD161J-222	CR
	R210	QRD161J-332	CR
	R211	QRD161J-472	CR
	R212	–	–
	R213	QRD161J-473	CR, E/EG
	R214	QRD161J-473	CR, E/EG
	R215	QRD161J-222	CR
	R216	QRD161J-222	CR
	R217	QRD161J-332	CR
	R218	QRD161J-472	CR
	R219	QRD161J-103	CR
	R220	QRD161J-0R0	CR
	R221	QRD161J-333	CR

# ⚠	REF. NO.	PART NAME	PART NAME, DESCRIPTION
	R222	QRD161J-331	CR
	R223	QRD161J-331	CR
	R224	QRD161J-331	CR
	R225	–	–
	R226	QRD161J-331	CR
	R401	PU57925-2	VR, TRACKING
	R402	PU59166	VR, SHARPNESS
	R403	–	–
	R404	–	–
	R405	PU58819	VR, REC LEVEL
	C1	QCBB1HJ-102	C CAP
	C2	QCC11EK-682	C CAP
	C3	PU57275-500	TR CAP, TIMER CLOCK
	C4	QCSB1HJ-270	C CAP
	C5	QCVB1CN-103	C CAP
	C6	QER61CM-476	E CAP
	C7	QCBB1HJ-102	C CAP
	C8	QER60JM-336	E CAP
	C9	QCVB1CN-103	C CAP
	C10	QER60JM-476	E CAP
	C11	PU59421-104	E CAP
	C12	QCY41HK-102	C CAP
	C13	QCS11HJ-220	C CAP
	C101	QER61HM-105G	E CAP
	C102	QER41CM-106	E CAP
	C103	QER41CM-106	E CAP
	C104	QFN41HJ-223	MY CAP
	C105	QER61HM-475	E CAP
	C106	QER61HM-225G	E CAP
	C201	QCBB1HJ-471	C CAP
	C202	QFN41HJ-273	MY CAP
	C203	QER41EM-475	E CAP
	C204	QER41HM-225	E CAP
	C205	QER40JM-476	E CAP
	C206	QER40JM-476	E CAP
	C207	QCBB1HJ-471	C CAP, EK ONLY
	L1	PU54223-101KG	PEAKING COIL
	L201	PU58822	TRAP COIL
	RA3	RNBHFA224	RESISTOR NETWORK
	RA4	RNBH5A105	RESISTOR NETWORK
	RA5	RGLD5X224K	RESISTOR NETWORK
	RA6	RNBH5A104	RESISTOR NETWORK
	RA7	RNBH5A104	RESISTOR NETWORK
⚠	CP1	ICP-F10	CIRCUIT PROTECTOR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
⚠	X1	PU58428	CERAMIC RESONATOR
⚠	X2	PU58394	CRYSTAL
	S13	PU57550	TACT SWITCH, RESET
	S14	PU57550	TACT SWITCH, CNT/REMAIN/DATE
	S15	PU57550	TACT SWITCH, INST. REC
	S16	–	–
	S17	PU57551	TACT SWITCH, TV PR. (+)
	S18	PU57551	TACT SWITCH, TV PR. (–)
	S27	PU57550	TACT SWITCH, SP/HI-FI LP
	S201	PU57550	TACT SWITCH, OPERATE
	S202	PU57551	TACT SWITCH, EJECT
	S203	–	–
	S204	PU57551	TACT SWITCH, STOP
	S205	PU57551	TACT SWITCH, PAUSE/STILL
	S206	PU57551	TACT SWITCH, PLAY
	S207	PU57551	TACT SWITCH, REW
	S208	PU57551	TACT SWITCH, FF
	S209	PU57551	TACT SWITCH, REC
	S210	PU57550	TACT SWITCH, AUDIO MONITOR
	S211	PU57551	TACT SWITCH, REC MUTE
	S401	PU59292	SLIDE SWITCH, INPUT SEL.
	S402	PU59292	SLIDE SWITCH, COUNT MEMORY
	S403	–	–
	S404	–	–
	S405	–	–
	S406	–	–
	S407	PU59296	SLIDE SWITCH, LEVEL IND
	S408	PU59292	SLIDE SWITCH, SUB/MAIN, E/EG
	S409	–	–
	S410	PU59292	SLIDE SWITCH, ONLINE, E/EG
	S417	PU59292	SLIDE SWITCH, MIX NORMAL
	WR1	PU58865-10	FLAT WIRE, X 2
	FDP	PU58961-3	FDP, E/EK
		PU58961-4	FDP, EG
	HD1	PQ31585	FDP HOLDER (L)
	HD2	PQ31310	FDP HOLDER (R)
	HD3	PQ40795-3	LED HOLDER, FOR D201
	HD4	PQ40795-5	LED HOLDER, FOR D208–213, 215
	SLD1	PQ31144	SHIELD CASE
	SLD2	PQ31145	SHIELD COVER
	CN1	PU59414-130	FPC CONNECTOR
	CN2	PU59414-130	FPC CONNECTOR
	CN3	PU58798-11	CAP. HOUSING

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU11473B2-02(E/EG)	HEADPHONE BOARD ASS'Y [25]
		PU11473A2-02(EK)	HEADPHONE BOARD ASS'Y [25]
	J401	PU58866	HEADPHONE JACK
	R404	PU57928	VR, H.P. VOLUME
	LC401	PU59885-223	EMI. FILTER
	LC402	PU59885-223	EMI. FILTER
		PDM3053	UPPER DRUM BOARD [41]
		PU22329B1	DECK TERMINAL BOARD ASS'Y [51]
	R1	QRD181J-151	CR
	R2	–	–
	R3	QRD181J-331	CR
	PHS1	GP3A21	PHOTO INTERRUPTER
	CN1	PU58798-17	CAP. HOUSING, 3–19
		PU22329D2	RELAY BOARD ASS'Y [52]
	LC1	PU59809-222T	EMI. FILTER
	LC2	PU59809-222T	EMI. FILTER
		PU22329A3	REC SAFETY BOARD ASS'Y [53]
	S1	PU58644-1-3	REC SAFETY SWITCH

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#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22329A4	END SENSOR BOARD ASS'Y [54]
	Q1	PN268R-NC	PHOTO TRANSISTOR
	CN1	PU49215-102	CAP. HOUSING
	HLD1	PQ31047	E.S. HOLDER

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#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
			LED BOARD [56]
	PWB	PU58602	LED BOARD
	R1	QRD161J-102	CR
	CN1	PU49215-106	CAP. HOUSING
	PHS1	PU58879	PHOTO INTERRUPTER

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#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
⚠		PQ10342-022	REMOTE CONTROL BOARD ASS'Y [RM]
	IC1	M50115APW	INTEGRATED CIRCUIT
	X1 (Q1)	2SD636R,S	TRANSISTOR
	X2 (Q2)	2SD636R,S	TRANSISTOR
	X3 (Q3)	2SB822Q,R	TRANSISTOR
	D1, D2	MA154WA	DIODE
	D3, D4	MA154WA	DIODE
	D5, D6	MA154WA	DIODE
	D7, D8	MA154WA	DIODE
	D9, D10	MA154WA	DIODE
	D11	MA165	DIODE
	D12	SE303AY	LED
	D13	SE303AY	LED
	R1	QRD181J-104	CR
	R2	QRD181J-474	CR
	R3	QRD181J-222	CR
	R4	QRD181J-471	CR
	R5	QRD181J-470	CR
	R6	QRD181J-1R2	CR
	R7	QRD181J-1R2	CR
	C1	QCF11HP-101	C CAP
	C2	QCF11HP-101	C CAP
	C3	QET40JM-107	E CAP
	CF1	CSB455EB1T	CERAMIC FILTER
	TML1	PQ10342-003	BATTERY TERMINAL (1) (+) SIDE
	TML2	PQ10342-004	BATTERY TERMINAL (2) (–) SIDE